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**Five-Year Review Report**

**First Five-Year Review Report  
for  
Continental Steel Superfund Site  
City of Kokomo  
Howard County, Indiana**

**July 2002**


**PREPARED BY:**

**Indiana Department of Environmental Management  
Indianapolis, Indiana**


**Approved by:**

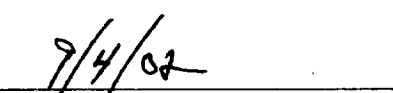
**Date:**





**Lori F. Kaplan, Commissioner  
Indiana Department of Environmental Management**

  
for **William E. Muno, Superfund Division Director  
U.S. Environmental Protection Agency, Region V**



# **FIVE YEAR REVIEW REPORT**

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## ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
ATSDR	Agency for Toxic Substances and Disease Registry
BERA	Baseline Environmental Risk Assessment
BHHRA	Baseline Human Health Risk Assessment
CAMU	Corrective Action Management Unit (landfill)
CERCLA	Comprehensive Environmental Response, Compensation and Liabilities Act
CFR	Code of Federal Regulations
COPC	Contaminant of Potential Concern
CSSS	Continental Steel Superfund Site
CUs	Contract Units
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
HQ	Hazard Quotient
IDEM	Indiana Department of Environmental Management
IDOH	Indiana Department of Health
IRA	Interim Remedial Action
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NCRA	Non-time Critical Removal Action
OUs	Operable Units
PAHs	Poly-Aromatic Hydrocarbons
PCBs	Poly-Chlorinated biphenyls
PP	Proposed Plan
SPM	State Project Manager
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
SF	Slope Factor
TCE	Trichlorethelene
TCRA	Time Critical Removal Action
TEC-1	Threshold Effect Concentration
UST	Underground Storage Tank
VOC	Volatile Organic Compound

## EXECUTIVE SUMMARY

The Continental Steel Superfund Site (CSSS) in Kokomo, Indiana, was initially addressed by an interim Resource Conservation and Recovery Act (RCRA) closure action performed by the Indiana Department of Environmental Management (IDEM) from 1989 to 1990. Several U.S. Environmental Protection Agency (EPA)-lead Time Critical Removal Actions (TCRAs) were performed from 1990 to 1993, and a State-lead Non-time Critical Removal Action (NCRA) was performed from 1998 to 1999. A State-lead Interim Remedial Action (IRA) was performed at CSSS from 1999 to 2000.

The interim RCRA closure action involved neutralization of waste sulfuric acid stored in open lagoons in the Acid Lagoon area, and placement of neutralized sludge back into the lagoons. The EPA-Lead TCRAs removed drums and contaminated soil from the Markland Avenue Quarry area. This action included removal of approximately 1100 drums from the quarry pond. EPA removed buried drums from several areas along the north bank of Wildcat Creek in the Acid Lagoon area; and removed drums, contaminated soil, above-ground tank contents, underground storage tanks and other waste materials from the Main Plant area. The IRA addressed imminent risk at Operable Unit 5A, the Main Plant area, and included the decontamination and demolition of 127 buildings and other structures, disposal of drummed wastes and disposal of other hazardous and non-hazardous waste materials.

The final Remedial Action (RA) is currently in the Remedial Design (RD) phase. It is tentatively scheduled (pending the availability of funds) to begin in 2003, and will include:

- Excavation of contaminated soils and sediment;
- Containment of contaminated soils and sediments in a Corrective Action Management Unit (CAMU) on site;
- Capping;
- Institutional controls;
- Treatment of shallow and intermediate groundwater; and
- Monitored natural attenuation of contaminated groundwater in the deep aquifer.

The assessment of this five-year review found that a protectiveness determination of the remedy, if carried out in accordance with the requirements of the Record of Decision (ROD), can not be made at this time until further information is obtained. One Explanation of Significant Differences (ESD) was issued to explain the increase in the cost of the IRA from the cost that was estimated in the Focused Feasibility Study. The NCRA and the IRA are functioning as designed. Groundwater cleanup goals in the shallow and intermediate aquifers are expected to be achieved through treatment, which is expected to require 30 years. Monitored natural attenuation and institutional controls comprise the RA for the deep aquifer. A Technical Impracticability Waiver was granted for the site-wide groundwater in the deep aquifer. Groundwater modeling performed during the Remedial Investigation (RI) predicts that it will take 100 years to reach cleanup goals in the deep aquifer.

# **FIVE-YEAR REVIEW SUMMARY FORM**

<b>SITE IDENTIFICATION</b>		
Site name (from WasteLAN): Continental Steel Superfund Site		
EPA ID (from WasteLAN):		
Region: V	State: IN	City/County: Kokomo/Howard
<b>SITE STATUS</b>		
NPL Status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation Status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Construction completion date __/__/__
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
<b>REVIEW STATUS</b>		
Lead agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Pat Likins		
Author Title: Project Manager		Author affiliation: Indiana Department of Environmental Management
Review period:** 05/04/1998 to 04/__/2002		
Date of site inspection: 04/15/2002		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input checked="" type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input checked="" type="checkbox"/> Actual RA on-site Construction at OU#_5_ <input type="checkbox"/> Actual RA Start at OU# __ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 05/04/1998		
Due Date (five years after triggering action date): 05/04/2003		

\* ["OU" refers to operable unit.]

\*\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

**Continental Steel Superfund Site  
Kokomo, Indiana  
First Five-Year Review Report**

**I. Introduction**

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identifies recommendations to address them.

IDEM is preparing this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA) Subsection 121 and the National Contingency Plan (NCP). CERCLA Subsection 121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP; 40 CFR 300.430(f)(4)(ii) that states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

IDEM conducted the five-year review of the remedy implemented at CSSS in Kokomo, Indiana. This review was conducted by the State Project Manager (SPM) for the entire site from March 2002 through July 2002. This report documents the results of the review.

This is the first five-year review for CSSS. The triggering action for this statutory review is the initiation of the NCRA on May 4, 1998. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.



## II. Site Chronology

**Table 1 - Chronology of Site Events**

March 1989	Based on preliminary investigations, Acid Lagoon area placed on the NPL. Main Plant and the Markland Avenue Quarry added shortly thereafter.
August 1989	EPA Technical Action Team inspected site for possible removal actions.
October 1989	IDEM contractor began removing and disposing of pickle liquor from the Acid Lagoon area. Lime was added to the pickle liquor to achieve a uniform pH. Treated liquor was then discharged to the Kokomo treatment plant.
February 1990	EPA began removing surface drums from Markland Avenue Quarry. A berm was constructed to inhibit off-site migration of contaminated water.
March 1990	EPA and IDEM inspected Main Plant for possible removal actions.
April 1990	EPA conducted an underwater investigation of Markland Avenue Quarry pond. Roughly 1,000 drums were found. Sampling was conducted.
May 1990	EPA removed drums, tank contents, capacitors and transformers from Main Plant. Removed over 200 chemicals from metallurgical lab. Drum disposal continued.
June 1990	IDEM contractor completed treatment and discharge of pickle liquor in Acid Lagoon area.
November 1990	IDEM conducted preliminary assessment of Dixon Road Quarry. The assessment indicated potential contamination.
June 1991	EPA began removal of over 1,100 submerged drums from Markland Avenue Quarry Pond.
May 1992	Some EPA TCRAs completed. Community interviews conducted for Community Relations Plan.
December 1992-February 1993	Approximately 1350 buried drums were removed from the bank of Wildcat Creek at the Acid Lagoon area. Also, 1250 cubic yards of contaminated soil was removed.
August 1993	Main Plant sampled for PCBs, PAHs, asbestos, and lead. Approximately 90 cubic yards of lead-contaminated dust consolidated and contained on site. Hundreds of cubic yards of lead-contaminated debris separated, stockpiled and covered for future disposal. Lead removed from the buildings. Asbestos presence confirmed. EPA sampled sewers and drained acid from tank T-18. Acid later disposed off-site.
October 1993	About 121 cubic yards of PCB contaminated soil excavated from western portion of Main Plant area, disposed off-site. Drums collected throughout site during the 1993 removal were stored for later disposal off-site.
1993	Phase I of Remedial Investigation completed. (Acid Lagoon area, Wildcat and Kokomo Creeks, site-wide groundwater).
Fall 1994	EPA removed contents and cleaned above ground storage tanks. Tanks T-14 and T-15 emptied but not cleaned.

December 1994	IDEM reported to EPA that one residential well was contaminated with Trichlorethelene (TCE).
March 1995	EPA installed an air stripper on the residential well.
1995	Phase II of Remedial Investigation completed (Markland Avenue Quarry, Main Plant, Slag Processing area and data gaps for Phase I with regard to site-wide groundwater, the Acid Lagoon area and the creeks.
June 1996	Indiana State Department of Health performed environmental radiation surveys in Slag Processing area, Acid Lagoon area, and the former laboratory area in the Main Plant. No evidence of gross radiological contamination.
September 1996	<b>Interim Record of Decision signed by IDEM and EPA to decontaminate and demolish buildings in Main Plant area.</b>
July 1997	IDEM proposed removal of lead contaminated soils from residential yards east of the Main Plant.
April 1997	<b>Action Memorandum documented decision to remove contaminated soils in residential area. Final Proposed Plan presented to the National Remedy Review Board for approval.</b>
February 1998 to March 1998	First public comment period for the Final Record of Decision for all six Operable Units.
April 1998 to May 1998	Second public comment period for final Record of Decision for all six Operable Units.
May 5, 1998	IDEM began removal of lead-contaminated residential soil.
September 1998	<b>Final Record of Decision signed for all six Operable Units. Marked completion of investigation and described cleanup actions.</b>
December 1998	Removal of lead contaminated residential soils completed.
April 1999	IDEM began decontamination and demolition of Main Plant buildings with asbestos survey.
December 28, 2000	IDEM completed decontamination and demolition of Main Plant buildings.
August 2001	Field investigative activities for Remedial Design completed.
July 2001	Basis of Design plans for Slag Processing area (proposed firing range scenario) completed. Implementation held pending local land use approval.
November 14, 2001	ESD presented at a Public Meeting.
December 14, 2001	Public comment period for ESD closes.
March 28, 2002	ESD signed by IDEM and EPA.
April 2002	Pre-final Basis of Design plans for Acid Lagoon area (CAMU construction) submitted.
May 20-21, 2002	Community interviews held for Five-Year Review.

June 11, 2002	IDEM commenced weed control and fence maintenance measures in Main Plant area.
June 13, 2002	Public Availability Sessions held for Five-Year Review.
June 24, 2002	EPA completed repairs to residential soil pile in Slag Processing area.
July 2002	Preliminary Basis of Design plans for Main Plant area submitted.

### **III. Background**

#### **Physical Characteristics**

The CSSS is located on West Markland Avenue in Kokomo, Indiana. The total site covers approximately 183 acres and includes an abandoned steel manufacturing facility (Main Plant). The Main Plant consists of about 94 acres and is bordered by Markland Avenue on the north, Park Avenue on the west, Leeds Street on the east and Kokomo Creek on the south. It included abandoned buildings with floor areas ranging from 10,000 square feet to 400,000 square feet. Many buildings had basements, some of which were flooded with ground water. Underground sewers and utility lines are also located on-site. The site was abandoned in 1986, so the buildings were deteriorated and the site was heavily overgrown with weeds and shrubs. There are no viable Potentially Responsible Parties, so the remedy is being funded by the Superfund Trust Fund through EPA with a 10% cost share being paid from the Indiana Hazardous Substances Response Trust Fund by the State of Indiana.

#### **Land and Resource Use**

Continental Steel was built in 1914. The plant produced nails, wire, and wire fence from scrap metal. Operations included reheating, casting, rolling, drawing, pickling, annealing, hot-dip galvanizing, tinning, and oil tempering. The steel manufacturing operations at the plant included the use, handling, treatment, storage, and disposal of hazardous materials. CSSS operated from approximately 1914 to 1986, before the company entered into bankruptcy. The area surrounding the facility is mixed residential, commercial, and industrial use and is zoned for general use, except for the Main Plant and Acid Lagoon areas, which have industrial-use-only deed covenants.

#### **History of Contamination**

The Markland Avenue Quarry was a former limestone quarry purchased in 1947 and used until the early 1980s by Continental Steel for the disposal of waste materials from steel processing operations. The quarry, approximately 23 acres in size, is bordered to the north by Harrison Street, to the south by West Markland Avenue, to the east by Courtland Avenue, and to the west by Brandon Street. Apparently, near-empty drums were taken to the quarry and the remaining contents dumped onto the ground. A large portion of the quarry has been backfilled with slag, refractory brick, pig iron, baghouse dust, and, possibly, drums. Previous investigations identified more than 400 drums, several tanks and other waste materials scattered across the property. Drums contained mostly oils, solvents, and refuse, and were disposed in the quarry pond. Drums were removed from the quarry pond in 1990 by EPA. The quarry is currently fenced. The unbackfilled portion of the quarry pond is mostly filled with water. Vegetation has grown in areas where backfill material was placed.

The Main Plant is bordered by West Markland Avenue to the north, Leeds Street to the east, and Park Avenue to the west, and extends west of Park Avenue to Wildcat Creek. The Main Plant included many abandoned buildings with basements (some of which were flooded with water), underground sewers, and utility lines. Previous investigations identified more than 700 oil and solvent-filled drums scattered throughout the Main Plant, 55 aboveground and underground storage tanks (ASTs/USTs) and 33 vats. Tanks and vats contained primarily oil and some

chlorinated solvents and acids. Twenty-four electrical transformers, 200 capacitors, electric arc furnace dust (baghouse dust), and exposed asbestos were also found at the Main Plant.

The Acid Lagoon area is located approximately 0.3 miles west of the Main Plant along the south side of West Markland Avenue (see Figure 2-1). The area covers approximately 56 acres and is composed of 10 lagoons that formerly received spent pickling and finishing liquors from the Main Plant. The area is bordered on the south and west by Wildcat Creek and to the east by the City of Kokomo wastewater treatment plant. The Acid Lagoon area is fenced along the entire perimeter, however, there are gaps in the fence. The lagoons now retain surface water runoff from rainfall.

Slag material generated from Continental Steel operations was processed and disposed in an area along West Markland Avenue approximately 0.2 miles west of the Acid Lagoon area. The area, known as the Slag Processing area, consists of approximately nine acres and is bounded to the north by West Markland Avenue, to the south and west by Wildcat Creek, and to the east by the Acid Lagoon area. Slag processing apparently involved the reclamation of metals from the slag. An undetermined amount of slag was placed in this area. The slag consisted primarily of calcium and iron oxides with lesser amounts of aluminum, chromium, lead, manganese, magnesium, and zinc oxides. Slag materials may also have been contaminated with oils and solvents. A portion of the Slag Processing area was formerly known as the Chaffin Quarry. The Chaffin Quarry may also have been used to dispose waste materials (i.e., drums) from the Main Plant. Currently the Slag Processing area is unfenced and contains exposed slag material. A 50-foot high mound of slag encompasses the west/northwest section of the area and a depression occurs in the southwest corner. The remainder of the area is graded. Lead-contaminated soil from the Residential Soil Removal Action is stockpiled in this area. To prevent any airborne release of contaminants, IDEM initially covered the stockpile with visqueen and it has since been regraded and hydroseeded by EPA. Slag piles are not covered, but present no threat of airborne release of contaminants. Direct contact risk is to future residents and construction workers only.

Groundwater beneath CSSS appears to have received contaminants from the Main Plant, the Markland Avenue Quarry, the Acid Lagoon area, other areas related to the site and possibly from adjacent industrial facilities. Groundwater quality varies considerably, however, and contamination exists outside the source areas identified above.

Kokomo and Wildcat Creeks run along the borders of the Main Plant and the Acid Lagoon area. The Kokomo area is drained by these two creeks which are tributaries of the Wabash River. Kokomo Creek is generally 15 to 20 feet wide and less than 2 feet deep, and Wildcat Creek is generally 30 to 50 feet wide and approximately 2.5 to 5 feet deep. The creeks have received water from the plant's wastewater recycling and filtration system, neutralized pickle liquor from the Acid Lagoon area, discharge from site outfalls, and stormwater runoff from the site.

### **Initial Response**

**Immediate Removal Actions.** Continental Steel was placed on the National Priorities List (Superfund list) in 1989. EPA began removal actions at the Main Plant and Markland Avenue Quarry in February 1990. Drums at the quarry and Main Plant were collected, staged, analyzed, and disposed. Capacitors and transformers were removed. Some tank liquids were analyzed and

disposed, and seven underground storage tanks were removed. Various chemicals were also removed from a laboratory facility at the Main Plant. Surface soil contaminated with polychlorinated biphenyls (PCBs) was removed from the former drum staging area at the quarry. Surface drums were over-packed, sampled, and disposed. A berm was also constructed. In May 1990, EPA staged and sampled many drums at the Main Plant. Tank content samples were collected and the liquids removed and disposed. Capacitor and transformer oils were analyzed, drained and disposed. In August 1993, the Main Plant area was sampled for PCBs, polycyclic aromatic hydrocarbons (PAHs), asbestos and lead. Approximately 90 cubic yards of lead-contaminated dust were consolidated, containerized, and stored on-site. Lead-contaminated debris was separated, stockpiled and covered for future disposal. Lead was removed from several of the buildings. Asbestos presence was confirmed in the buildings. EPA sampled sewers and drained the acid from tank T-18. The acid was disposed off-site. In October 1993, one cubic yard of PCB-contaminated soil was excavated from the western portion of the Main Plant and disposed off-site. Various drums collected throughout the site from previous removal efforts were disposed off-site. In the fall of 1994, EPA removed contents and cleaned several above ground storage tanks, and several others were emptied but not cleaned.

**Interim Remedial Action - Decontamination and Demolition of Main Plant Buildings.** IDEM performed an investigation of the Main Plant area in 1995. The investigation identified concerns that the buildings presented a potential risk to nearby residents and trespassers. As a result, an Interim Risk Assessment/Feasibility Study for the Main Plant Buildings was performed in 1996 and an Interim Proposed Plan was developed. The Interim Proposed Plan recommended that the buildings be decontaminated and demolished. Four alternatives were presented for consideration. They were:

- Alternative 1 - No Action;
- Alternative 2 - Immediate Decontamination and Demolition of the Buildings;
- Alternative 3 - Immediate Decontamination of the Buildings; and
- Alternative 4 - Securing the Buildings.

The proposed plan was presented to the public in March 1996, and signed in September 1996. Alternative 2 – Immediate Decontamination and Demolition of the Main Plant Buildings was the chosen alternative. Removal of the building structures would likely be required prior to remediation of contaminated soil that was detected during the investigation. The presence and poor physical condition of the structures would make the remediation of the soil more difficult. It would be impracticable to underpin or partially demolish a structure to gain access to soils beneath. As buildings continued to deteriorate, the potential for the contaminants inside to be released and migrate off-site would increase. Therefore, a greater potential for additional risks to human health and the environment would be created. The major components of the selected interim remedy included:

- Gross removal of lead dust from building interiors with disposal of dust as hazardous waste in a permitted facility;
- Management and proper disposal of rinse water collected from decontamination;
- Abatement of exposed friable asbestos-containing material and asbestos-containing insulation by removal and disposal at a permitted facility;
- Sampling to confirm decontamination;

- Removal of PCB-contaminated wood block floors and disposal as hazardous waste;
- Demolition of all building superstructures, tanks, and equipment to grade, leaving floor slabs;
- Salvaging of structural steel as scrap unless it could be decontaminated and reused;
- Disposal of all debris and demolition rubble as hazardous, special or non-hazardous waste as determined by waste characterization;
- Use of water for dust control during demolition. Dust control water runoff would be contained and managed properly;
- Pumping out flooded basements, removal of equipment and residue;
- Filling or covering of pits and basements;
- Finishing of unpaved areas with crushed stone; and
- Securing of the site after the interim remedy was completed.

The work began with an asbestos survey in April 1999 and was completed on December 28, 2000.

**Non-time Critical Removal Action - Residential Soil Removal Action.** To address the threat to human health posed by lead-contaminated residential soils, a Non-time Critical Removal Action was performed. The action included excavation of contaminated surface soil and placement in an off-site landfill. The total volume of material that was excavated from the off-site residential area was approximately 14,700 cubic yards.

The components of this alternative were as follows:

- Removal of small shrubbery and yard equipment from the residential area of concern;
- Removal of lead contaminated surface soil to a depth of approximately one foot;
- On-site x-ray fluorescence testing of excavated surface soil samples for lead to determine limits of excavation;
- Laboratory confirmation sampling of approximately 20 percent of the surface soil samples (approximately 200);
- Backfill excavation to grade with clean fill;
- Restoration of the site with sod and replacement of small shrubbery and yard equipment;
- Transportation of contaminated soil to an off-site landfill;
- Dust suppression measures including wetting down and covering exposed soils during transportation off-site as appropriate; and
- Preventative measures (i.e., temporary fencing, caution tape and flagging) during construction activities to inhibit visitor (children) intrusion onto the removal area.

The work began on May 5, 1998, and concluded on February 26, 1999.

#### **Basis for Taking Action**

IDEM and EPA have determined that the CSSS poses potential long-term risks to human health and the environment by the presence of various chemical constituents above the acceptable cancer risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ , and above the non-cancer hazard risk quotient of one (1), that were established in the NCP, 40 Code of Federal Regulations (CFR)

300.430(e)(2)(i)(A)(2). This determination was documented in the ROD for CSSS, signed by IDEM and EPA on September 30, 1998.

#### **IV. Remedial Actions**

##### **Remedy Selection**

The preferred RAs for the six Operable Units (OUs) of CSSS were presented to the public in a Proposed Plan (PP) in March 1997, and the RA selection was documented in the ROD signed by IDEM and EPA September 30, 1998.

##### **Remedy Implementation**

No final remedial actions have been completed at this time.

##### **System Operation/Operation and Maintenance (O&M)**

O&M will begin after the components of the RA have been constructed. There are no O&M activities required by the interim RCRA closure, immediate removal actions, or the IRA.

#### **V. Progress Since the last Five-Year Review**

This is the first five-year review for CSSS.

#### **VI. Five-Year Review Process**

##### **Administrative Components**

Members of the community were notified of the initiation of the five-year review by postcards mailed on June 6, 2002; by ads placed in the Kokomo Tribune on June 9, 2002; and by ads placed in the Kokomo Perspective on June 6, 2002. The CSSS Five-Year Review team was led by Pat Likins of IDEM, State Project Manager (SPM) for CSSS, and included members from IDEM Science Services staff with expertise in hydrology, biology, and risk assessment. Risk Assessment review was performed with the assistance of a contractor. Mr. Matt Mankowski and Mr. Fred Bartman of EPA assisted in the review as representatives for the support agency.

On May 30, 2002, the review team established the review schedule whose components included:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Report Development and Review.

The schedule extended through September 30, 2002.

##### **Community Involvement**

Activities to involve the community in the five-year review were initiated with a public availability session. A notice was sent to two local newspapers that a five-year review was to be



conducted and that there would be a public availability session on June 13, 2002. Postcards stating the same were sent to community members, the Howard County Health Department, the Office of the Mayor of Kokomo, the County Commissioner's Office, Congressman Buyer, Senator Lugar, Senator Coates, and State Representative Herrell, and the residents of properties adjacent to the CSSS. The postcards invited the recipients to submit any comments to IDEM.

During the public availability sessions and the interviews, members of the community expressed concerns that creek sediments posed direct contact risk to children and requested that warning signs be posted. Community members also expressed that on-site containment and construction of the CAMU are not protective in the long term. Other community members expressed approval of these actions. An elected official stated that the waste should be shipped to an existing facility and asked about the difference in cost for off-site disposal. Other issues addressed in the community interviews were communication and future land use. A full report of issues and information compiled from the interviews is presented in Attachment 5.

On ~~(date to be included following EPA review of report)~~, a notice was sent to the same local newspapers that announced that the Five-Year Review report for the CSSS was complete, and that the results of the review and the report were available to the public at the Kokomo/Howard County Public Library and IDEM office.

#### **Document Review**

This five-year review consisted of a review of relevant documents including: the 1996 Interim Record of Decision; the 1998 Final Record of Decision; the 2001 Explanation of Significant Differences - Operable Unit 5-A (Decontamination and Demolition of Main Plant Buildings); the Baseline Human Health Risk Assessment (BHHRA); the NCRA Remediation Completion Report, and pre-design investigation data. Applicable groundwater cleanup standards, as listed in the 1998 Record of Decision, were reviewed (see Attachment 4).

#### **Data Review**

##### **Groundwater**

The planned RA provides for groundwater monitoring at regular intervals. Sampling performed from May through August of 2001 for the RD indicated horizontal and vertical extents of contamination in shallow, intermediate and deep groundwater consistent with those identified during the RI/FS. The extent of the northward-trending portion of contaminated groundwater near the Markland Quarry area that extends into a residential area has not been identified. Although residences in the area are connected to the municipal water supply, the RI/FS did not identify if, or the extent to which, homes with basements are affected by contaminated groundwater. Only newly installed wells were sampled in 2001, therefore we do not have data to directly compare to the results of samples collected from wells during the RI/FS.

##### **Surface Water and Sediment**

Sampling performed from May through August of 2001 for the RD indicated that there has been little change to the condition of surface water and sediment in Markland Quarry and in Kokomo and Wildcat Creeks. The level of contamination in the sediments of Kokomo and Wildcat Creeks remains elevated. The "Evaluation of Sediments in Kokomo and Wildcat Creeks" did determine that the background levels for PCBs in Kokomo and Wildcat Creeks were lower than previously determined. Since the cleanup goals were based on background, the evaluation recommended

new cleanup goals consistent with current background information. The report also provided more concise data regarding the sediment volume. Using the new data and applying a risk-based approach, the estimated volume of sediment to be excavated from the creeks has been greatly reduced.

Recent sampling verified that the current pH of Markland Quarry surface water is 11.5. Sampling also confirmed that sediment at the bottom of the quarry, targeted for excavation, will require treatment to reduce the volume of Volatile Organic Compound (VOC) contaminants prior to disposal.

#### **Soil and Sludge**

Sampling performed from May through August 2001 for the RD provided more specific information regarding the vertical and horizontal extent of soil and sludge contamination in the Acid Lagoon area and the Main Plant area. Soil borings in the Main Plant indicated that the areas requiring common soil cover due to the presence of metals, PCBs, and PAHs, are considerably larger than previously estimated. The area along the south perimeter of the Main Plant that is contaminated with PCBs and lead was also determined to be larger than previously estimated. The contaminated area along the south perimeter that is within the flood plain is to be excavated in accordance with the ROD.

#### **Site Inspection**

Inspections at the site were conducted on April 15, 16 and 17, 2002, by the SPM. The purpose of the inspections was to assess the protectiveness of the remedy, including the presence of fencing to restrict access. Institutional controls were evaluated by reviewing the Title Search completed by EPA on March 15, 2002.

The fence was found to be ineffective at the Acid Lagoon area. The fence had been destroyed in a large area along the east perimeter (between the Acid Lagoon area and the Kokomo Municipal Wastewater Treatment facility). Heavy debris was causing the fence to lean along the south perimeter of the property at the northeast corner of the Acid Lagoon area. (The adjoining property is part of the Kokomo wastewater treatment plant). Several cuts were noted in the fence at the Markland Avenue Quarry.

Institutional controls that are in place include deed restrictions at the Acid Lagoon area and the Main Plant area limiting the use of those areas to industrial/commercial use.

#### **Interviews**

Interviews were conducted with various parties connected to the site. Interview forms were also provided during the public availability sessions on June 13, 2002. A total of twenty interviews were completed. The full report of results is presented in Attachment 5.

### **VII. Technical Assessment**

#### **Question A**

Is the remedy functioning as intended by the decision documents?

**Answer A**

The review of documents, Applicable or Relevant and Appropriate Requirements (ARARs), risk assumptions, and the results of the site inspection indicate that further information is needed in order to determine whether the remedy, when implemented, would function as intended by the ROD. This review recommends the adoption of the new Maximum Contaminant Level (MCL) that has been established for Arsenic. (See Answer B below.) There were no opportunities for system optimization observed during this review, however, value engineering evaluations have identified some efficiencies that could be incorporated into the RD. Institutional controls in the form of deed restrictions limit the use of two areas of the site, the Main Plant area and the Acid Lagoon area, to industrial/commercial use. No activities were observed that would have violated the institutional controls, however evidence of trespassing was observed in all areas of the site. There is no physical barrier that restricts access to Kokomo and Wildcat Creeks. Fences around the Acid Lagoon area and the Markland Avenue Quarry area are not intact. The entrance to the Slag Processing area restricts automobile or truck access, but there is no fence to restrict access by foot or other means. There is evidence of recent trespassing in the Acid Lagoon area and the Main Plant area.

#### Question B

Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

#### Answer B

The exposure assumptions used to develop the Baseline Human Health Risk Assessment (BHHRA) are listed in the following table.

**Table 2 - Baseline Risk Assessment - Populations That May Be Exposed**

Receptors	Current	Future
Onsite residents		<b>MQ, SP, GW/MQ, GW/SP</b>
Offsite Residents	<b>MP<sup>(**)</sup>, MQ<sup>(****)</sup>, GW<sup>(*)</sup></b>	<b>MP<sup>(**)</sup>, MQ, GW</b>
Onsite Commercial/Industrial Workers	MQ	MP, MQ, AL, SP, GW
Offsite Commercial/Industrial Workers	GW	GW
Trespassers	MP, MQ, AL, SP	MP, MQ, AL, SP
Recreational Visitors	KWC	KWC
Onsite Construction Workers		MP, MQ, SP, GW

MP= Main Plant area, MQ = Markland Quarry, AL = Acid Lagoon area, SP = Slag Processing area, GW = Groundwater, KWC - Kokomo and Wildcat Creeks

Exposure routes that exceeded cancer or non-cancer criteria are indicated by **bold print**.

(\*) No current off-site residents within the affected area are believed to be using groundwater.

(\*\*) This risk was addressed by the NTRA performed from 1998 to 1999.

(\*\*\*\*) BRA recommended further investigation. See Sections VIII and IX.

These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels.

The BHHRA was reviewed to determine whether changes in site conditions, screening criteria, or toxicity values that have occurred since the risk assessment was completed would increase the risks previously estimated or introduce additional risks not previously considered, and whether the established remediation goals require modification as a result. The full report is included in this report as Attachment 4. Although there were increased risks associated with toxicity changes for a number of Contaminants of Potential Concern (COPCs) and additional COPCs identified using new screening criteria, they were not significant in most cases. Only risks associated with groundwater use were significantly impacted.

Risks associated with potential exposure to TCE in groundwater increased substantially due to the revisions of the Slope Factors (SFs) and the oral Reference Dose (RfD). Nevertheless, the remediation goal for TCE, which was set at the drinking water MCL of 0.005 mg/L, still appears to be adequately protective. In shallow groundwater, risks associated with exposures to iron and arsenic, which were not evaluated in the original assessment, are estimated to be above acceptable levels. The new MCL for arsenic of 0.010 mg/L should be adopted as remediation goal for groundwater, consistent with the goals already established. The remediation goal for iron in groundwater could be set at its secondary MCL of 0.3 mg/L (as was done for manganese) or a higher risk-based value up to 5 mg/L.

**Table 3      Changes in Chemical Specific Standards**

CONTAMINANT OF POTENTIAL CONCERN	PREVIOUS MCL	CURRENT MCL
Arsenic	0.050	0.010
Iron (secondary MCL)		0.3

Based on a review of updated ecological screening benchmarks, new COPCs were identified for each exposure area. In addition, chemicals with a log  $K_{ow}$  greater than 3.5 were included as COPCs due to their potential to bio-accumulate. Chemical-specific exposure factors and toxicity values also were updated during the review process.

Remediation goals for the site were based mainly on the results of the BHHRA and background concentrations. Since Hazard Quotients (HQs) for ecological receptors substantially greater than 1 were estimated in the Baseline Environmental Risk Assessment (BERA) but not addressed in the ROD, it did not appear useful to recalculate all exposure estimates and HQs for the American robin, Indiana bat, and great blue heron. Ecological screening benchmarks for surface soil indicated that final remediation goals for the Markland Avenue Quarry, Acid Lagoon area, and Slag Processing area were below the benchmarks except for lead in the Acid Lagoon area (remediation goal of 1,096 mg/kg vs screening level of 500 mg/kg). All final remediation goals for the Main Plant exceeded ecological screening benchmarks. Comparison of final remediation goals for sediment to ecological screening benchmarks indicated that remediation goals are not protective of ecological receptors.

**Table 4 - Chemical-Specific Factors for COPCs**

<p><b>Table B-5</b>  <b>Chemical-Specific Factors for COPCs</b>  <b>Continental Steel Superfund Site</b>  <b>Kokomo, IN</b></p>			
<b>Chemical</b>	<b>STPs<sup>(a)</sup></b>	<b>BAFinv<sup>(b)</sup></b>	<b>STI/F<sup>(c)</sup></b>
Acenaphthene	0.12	30.3	607
Acenaphthylene	0.17	30.3	NA
Anthracene	0.11	30.3	2,600
Benzo(a)anthracene	0.019	30.3	5,100
Benzo(a)pyrene	0.011	30.3	9,950
Benzo(b)fluoranthene	0.011	30.3	9,950
Benzo(b,k)fluoranthene	NA	30.3	9,950
Benzo(k)fluoranthene	0.0043	30.3	9,950
Benzo(g,h,i)perylene	0.0056	30.3	NA
Bis(2-ethylhexyl)phthalate	0.055	30.3	360
Chrysene	0.019	30.3	6,030
Dibenzo(a,h)anthracene	0.0043	30.3	12,800
Fluoranthene	0.055	30.3	15,700
Fluorene	0.11	30.3	1,200
Indeno(1,2,3-cd)pyrene	0.0056	30.3	13,100
Pentachlorophenol	0.014	30.3	397
Phenanthrene	0.082	30.3	3,300
Pyrene	0.055	30.3	11,900
Acetone	52	30.3	0.4
1,1-Dichloroethene	3.4	30.3	24.1
Methylene chloride	6.7	30.3	5.3
2-Methylnaphthalene	0.21	30.3	NA
Trichloroethene	1.5	30.3	41.6
Toluene	1.0	30.3	62.7
Vinyl chloride	1.0	30.3	4.37
Xylenes	1.0	30.3	160
Aroclors	0.013 (0.02)	30.3 (3.0)	9.016 (5.058)
Antimony	0.005	0.523	40
Arsenic	0.0371	0.523	0.329
Barium	0.1	1.0	NA
Beryllium	0.01	1.0	42
Cadmium	0.517 (0.55)	40.7 (4.6)	2.822
Chromium	0.04	3.16	0.179
Cobalt	0.054	1.0	NA
Copper	0.123	1.53	2.424
Lead	0.0377	1.52	0.276
Manganese	0.68	0.29	NA
Mercury	1.0	20.6	1.422 (1)
Nickel	0.0342	4.73	0.857
Thallium	0.004	1.0	1,400
Zinc	0.358	12.9	3.092

Notes:

Numbers in parenthesis were values used in CSSS ERA.

Values greater than 1 will lead to increased risk estimates and are printed in bold type.

(a) = STP factors from Bechtel Jacobs Company (1998a) and RAIS (2002).

(b) = BAF<sub>inv</sub> factors for inorganic COPCs from Sample et al. 1998 and Braunschweiler 1996;

BAF<sub>inv</sub> factors for organic COPC values were calculated using Menzie et al. (1992) methods.

Assumes lipid content of earthworm is 2%,  $f_{oc}$  is 0.01.

(c) = STI/F factors for inorganic COPCs and PCBs from Bechtel Jacobs Company (1998b); all other STI/F from EPA (1998).

NA = Not available.

**Table 5 - Chemicals Detected in Surface Soil (Non-Residential) - Main Plant, Acid Lagoon area**

Table A-3 Chemicals Detected in Surface Soil (Non-Residential) - Main Plant, Acid Lagoon area			
Chemicals Detected	New and/or Lower Screening Value?	COPC added?	Comment
<b>Inorganics</b>			
Aluminum	no	No	
Antimony	no	No	
Arsenic	no	No	
Barium	no	No	
Beryllium	no	No	
Cadmium	no	No	
Calcium	no	No	
Chromium (as Cr VI)	YES	No	Already a COPC, Acid Lagoon area
Cobalt	YES	No	Max < current screening value
Copper	no	No	
Cyanide	no	No	
Iron	no	No	
Lead	no	No	
Magnesium	no	No	
Manganese	no	No	
Mercury	no	No	
Nickel	no	No	
Potassium	no	No	
Selenium	no	No	
Silver	no	No	
Sodium	no	No	
Thallium	YES	No	Max < current screening value
Vanadium	no	No	
Zinc	no	No	
<b>Pesticides/PCBs</b>			
4,4'-DDD	no	No	
4,4'-DDE	no	No	
4,4'-DDT	no	No	
Aldrin	no	No	
alpha-BHC	no	No	
alpha-Chlordane	no	No	
delta-BHC	no	No	
Dieldrin	no	No	
Endosulfan I	no	No	
Endosulfan II	no	No	
Endosulfan Sulfate	no	No	
Endrin	no	No	
Endrin aldehyde	no	No	
Endrin ketone	no	No	

gamma-BHC	no	No	
gamma-Chlordane	no	No	
Heptachlor	no	No	
Heptachlor epoxide	no	No	
Methoxychlor	no	No	
Aroclor 1242	YES	No	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1248	YES	No	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1254	YES	YES	Acid Lagoon area, Max > current screening value
Aroclor 1260	YES	No	Already a COPC, Main Plant
<b>Semivolatiles</b>			
1,2,4-Trichlorobenzene	no	No	
Phenol	no	No	
Pentachlorophenol	no	No	
Carbazole	no	No	
Bis(2-ethylhexyl)phthalate	no	No	
Di-n-butylphthalate	no	No	
Di-n-octylphthalate	no	No	
Dibenzofuran	no	No	
2-Methylnaphthalene	YES	No	Max < current screening value
Acenaphthene	no	No	
Acenaphthylene	no	No	
Anthracene	no	No	
Benzo[a]anthracene	no	No	
Benzo[a]pyrene	no	No	
Benzo[b]fluoranthene	no	No	
Benzo[b&k]fluoranthene	no	No	
Benzo[g,h,i]perylene	no	No	
Benzo[k]fluoranthene	no	No	
Chrysene	no	No	
Dibenz[a,h]anthracene	no	No	
Fluoranthene	no	No	
Fluorene	no	No	
Indeno[1,2,3-cd]pyrene	no	No	
Naphthalene	YES	No	Max < current screening value
Phenanthrene	no	No	
Pyrene	no	No	
<b>Volatiles</b>			
1,1,2-Trichloroethane	no	No	
1,1-Dichloroethane	no	No	
1,1-Dichloroethene	no	No	
1,2-Dichloroethane	no	No	
1,2-Dichloroethene (total)	no	No	
2-Butanone	no	No	
2-Hexanone	YES	No	Max < current screening value
4-Methyl-2-pentanone	no	No	
Acetone	no	No	
Benzene	YES	No	Max < current screening value
Carbon disulfide	no	No	



Chlorobenzene	YES	No	Max < current screening value
Chloroethane	YES	No	Max < current screening value
Chloroform	no	No	
cis-1,3-Dichloropropene	no	No	
Ethylbenzene	no	No	
m,p-Xylenes	no	No	
Methylene chloride	no	No	
o-Xylene	no	No	
Styrene	no	No	
Tetrachloroethene	no	No	
Toluene	no	No	
Xylenes (total)	no	No	
Trichloroethene	YES	YES	Main Plant, Acid Lagoon area, Max > current screening value
Vinyl chloride	no	No	

Screening value = 0.1 x RBC for Residential Soil from EPA Region III (EPA 2002).

### Question C

Has any other information come to light that could call into question the protectiveness of the remedy?

### Answer C

The Indiana Department of Health (IDOH), in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), has compiled a list of residential wells that should be evaluated to determine if they have been impacted since the completion of the RI. See Sections VIII and IX of this review. Community interviews identified concerns regarding commercial and residential properties near the Markland Avenue Quarry that may be affected by contaminated groundwater.

Further investigation of offsite residential soil was recommended in the area near the Markland Quarry that has not been performed. This is further explained in Section VIII (Issues) and Section IX (Recommendations). Cleanup levels for PCBs in sediments in Kokomo and Wildcat Creeks have been re-evaluated based on updated information regarding background. The resultant cleanup goals for PCBs have been reduced from 5.0 ppm to an average for each reach of less than 1.0 ppm. This is further explained in Section VIII (Issues) and Section IX (Recommendations). Exposure assumptions and cleanup levels for other areas may change based on the outcome of the "Reuse Analysis of the Continental Steel Superfund Site." This is further explained in Sections VIII and IX of this review.

Updated citations for many Indiana ARARs are provided in Attachment 3.

### Technical Assessment Summary

A protectiveness determination of the remedy at CSSS cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions:

- Performing further soil sampling in residential area near Markland Quarry;

- Performing vapor sampling and/or water sampling in residential and commercial basements near the Markland Quarry;
- Performing additional residential well sampling as indicated by the results of 2001 monitoring well sampling results;
- Evaluation of the results of the BHHRA review with regard to arsenic, trichloroethene (TCE), Arochlor 1254, and iron; and
- Evaluation of remedial actions relative to the completed "Re-use Analysis of the Continental Steel Superfund Site."

It is expected that these actions will take approximately one year to complete, at which time a protectiveness determination will be made.

#### VIII. Issues:

**Table 6 - Issues**

<b>Issue</b>	<b>Currently Affects Protectiveness (Y/N)</b>	<b>Affects Future Protectiveness (Y/N)</b>
1. A recent Health Consultation performed by the IDOH contains a recommendation to collect current data from several residential wells, to ensure that there are no residential wells contaminated by the Continental Steel Superfund site.	Y	Y
2. The City of Kokomo received a grant from EPA to perform a "Reuse Analysis of the Continental Steel Superfund Site." This analysis, which included community participation as a major component, may result in a change in the community's desired future land use for certain areas of the CSSS.	N	Y
3. Remediation goals for Kokomo and Wildcat Creeks were based upon background levels. A re-evaluation of existing background levels completed in 2002 determined that current background levels are significantly lower.	Y	Y
4. Data indicates contamination from CSSS contributed to levels of PCBs in fish, and presents a direct contact risk to recreational users. A level five (5) fish consumption advisory is in place for Kokomo and Wildcat Creeks, designating all fish from this stream unsafe for human consumption in any amount. Fish Consumption Advisory signs were posted. No physical barrier prevents access to the creeks. Kokomo Creek runs through Highland Park. Children and adults have been observed fishing in Kokomo Creek.	Y	Y
5. For the purposes of the RI, CSSS was divided into six geographical OUs. To divide work into manageable units to accommodate incremental funding, the project was re-organized into units of similar tasks scheduled in order of priority. A new Remedial Design/Remedial Action (RD/RA) Implementation Strategy re-organized the project into five (5) Contract Units (CUs).	N	N
6. The chemical-specific cleanup goals were clearly defined in the BHHRA, however, they were not identified in the ROD. Updated information on background levels in Kokomo and Wildcat Creeks, collected during the pre-design investigation, indicates that the cleanup goal for PCBs should be reduced.	N	Y

Review of the BHHRA indicated the need for additional COPCs and cleanup goals for groundwater.		
7. Fences around the Acid Lagoon area and the Markland Avenue Quarry area are not intact. There is evidence of recent trespassing in both areas.	Y	Y
8. The BHHRA recommended further investigation of offsite residential soils in the Markland Quarry area due to the detection of dibenzo(a,h)anthracene in one offsite soil sample at a level that, if the sample was representative of off-site exposure, may exceed EPAs acceptable risk range. Insufficient data was available to make a determination. Further investigation has not been performed.	Y	Y

## IX. Recommendations and Follow-up Actions:

**Table 7 - Recommendations and Follow-Up Actions**

Issue	Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
1. Residential wells	Evaluation of groundwater data collected during the pre-design investigation, and sampling of Residential Wells.	IDEM/ EPA	IDEM/ EPA	12/30/02	Y	Y
2. Evaluation of re-use, community participation in remedial design (RD).	IDEM and EPA are coordinating with Kokomo and their contractor, Strand Associates, Inc., to maximize incorporation of re-use plans into the RD. If a desired reuse requires a feasible change in designated land use for an area, IDEM will prepare an Explanation of Significant Differences (ESD).	IDEM/ EPA	IDEM/ EPA	6/30/03	N	Y
3. Creek Sediments, background levels	Sediment data was collected during the pre-design investigation, and the RA for Kokomo and Wildcat Creek sediments was re-evaluated. Updated background levels in Kokomo and Wildcat Creeks indicate that the cleanup goal for PCBs should be reduced from five (5) parts per million (ppm) to one (1) ppm. The proposed cleanup goal will be presented in PP for a ROD Amendment.	IDEM/ EPA	IDEM/ EPA	12/30/02	N	Y
4. Creek sediments, exposure risks	Excavation will eliminate the risk of direct contact with creek sediment. However, levels of PCBs in fish are not	IDEM/ EPA	IDEM/ EPA	6/30/03	Y	Y

	expected to decrease enough to render fish edible for several years. Potential threats to human health through fish consumption is temporarily addressed by Fish Consumption Advisory signs. Further public education is advised. IDEM is funding and performing posting of signs in contaminated areas to discourage direct contact.					
5. Revised Project Implementation Strategy	A PP for a ROD Amendment will be presented to the public for comment. This will incorporate the new RD/RA Implementation Strategy, all chemical-specific cleanup goals, and the new proposed cleanup goals for PCBs in Kokomo and Wildcat Creeks.	IDEM/ EPA	IDEM/ EPA	12/30/02	N	Y
6. ROD Amendment to update CPOCs	A PP for a ROD Amendment will be presented to the public for comment. This will incorporate the new RD/RA Implementation Strategy, all chemical-specific cleanup goals, and the new proposed cleanup goals for PCBs in Kokomo and Wildcat Creeks.	IDEM	IDEM	12/30/02	N	Y
7. Fence Repairs	Fence repairs will be included in the RA. IDEM is funding and performing ongoing fence maintenance in the Main Plant area.	IDEM/ EPA	IDEM/ EPA	10/30/02	Y	Y
8. Markland Quarry area soil and ground water	Further sampling of residential soil and indoor air and/or water sampling in nearby basements should be performed in the Markland Quarry area.	IDEM/ EPA	IDEM/ EPA	12/30/02	Y	Y

**X. Protectiveness Statement(s):**

A protectiveness determination of the remedy at CSSS cannot be made at this time until further information is obtained. The interim RCRA closure, RA, NTCR and the IRA are functioning as designed. Immediate threats to human health were addressed through these actions. The potential threat to human health through consumption of fish from Kokomo and Wildcat Creeks is being temporarily addressed by placement of Fish Consumption Advisory signs along the affected areas of the creeks.

**Long-term Protectiveness:**

A protectiveness determination of the remedy at CSSS cannot be made at this time until further information is obtained. Groundwater cleanup goals in the shallow and intermediate aquifers are expected to be achieved through treatment, which is expected to require 30 years. Monitored natural attenuation and institutional controls comprise the remedial action for the deep aquifer. A Technical Impracticability Waiver was granted for the site-wide groundwater in the deep aquifer. Groundwater modeling performed during the RI predicts that it will take 100 years to reach cleanup goals in the deep aquifer.

**Other Comments:**

**XI. Next Review**

The next five-year review should be performed no later than five years from the date that this review is approved by IDEM and EPA. The review should be completed by September 30, 2007.

**Attachments**

Attachment 1 Site Map

Attachment 2 List of Documents Reviewed

Attachment 3 Table Documenting Changes in Standards and Updated Citations for Indiana  
ARARs)

Attachment 4 Final Report, Baseline Risk Assessment Review

Attachment 5 Interview Report

Attachment 6 Photos Documenting Site Conditions

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**ATTACHMENT 1 - Site Map**

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**ATTACHMENT 2 - List of Documents Reviewed**

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**ATTACHMENT 3 - Tables Documenting Changes in Standards  
and Updated Citations for Indiana ARARs**

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**ATTACHMENT 4 - Final Report, Baseline Risk Assessment  
Review**

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**ATTACHMENT 5 - Interview Report**

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**ATTACHMENT 6 - Photos documenting Site Conditions**

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**APPENDIX A - 1998 Record of Decision ARARS**

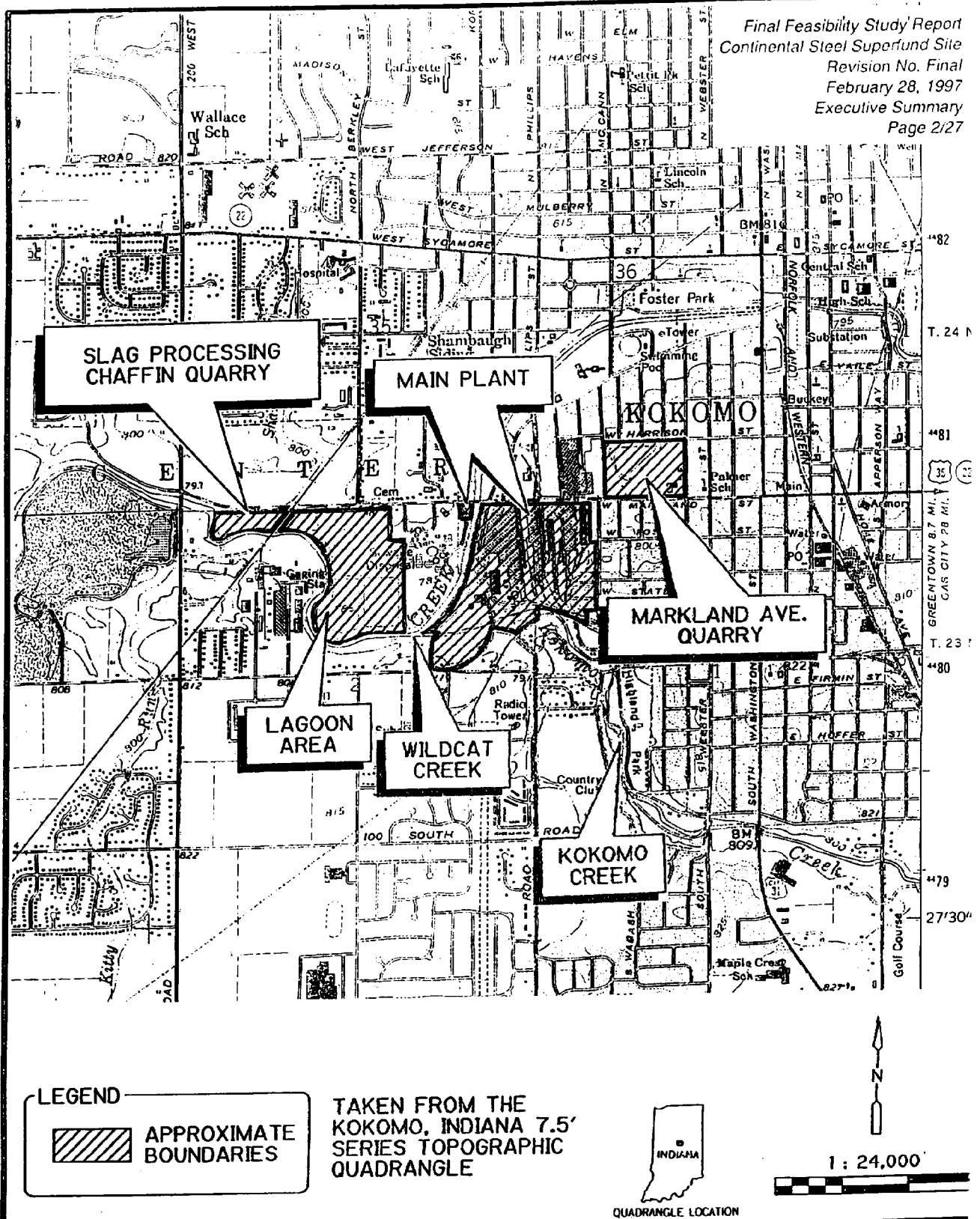
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**APPENDIX B - Comments received from Support Agencies  
and/or the Community**

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**ATTACHMENT 1**  
Site Map





CONTINENTAL STEEL SUPERFUND SITE  
KOKOMO, INDIANA  
FEASIBILITY STUDY  
SITE LOCATION MAP

**CDM**  
environmental engineers, scientists,  
planners, & management consultants

**ATTACHMENT 2**  
**List of Documents Reviewed**

## **ATTACHMENT 2 - List of Documents Reviewed**

- Interim Record of Decision, September 1997
- Final Record of Decision, September 1998
- Action Memorandum, April 1997
- Baseline Human Health Risk Assessment, February 21, 1997
- Final Feasibility Study, February 28, 1997
- Continental Steel Superfund Site Contract 1 Geological Investigations, October 23, 2001
- Groundwater Sampling Results, Continental Steel Superfund Site (Report not dated, data collected June 2002 through August 2001.)
- Health Consultation, Continental Steel Corporation, U.S. Department of Health and Human Services, May 8, 2002
- Five-Year Review of the Baseline Risk Assessment for the Continental Steel Superfund Site, Ecology & Environment, June 13, 2002
- NCRA Remedial Action Completion Report, Radian Intl., September 15, 1999
- Evaluation of Sediments in Wildcat and Kokomo Creeks, CH2MHill, March 2002

**ATTACHMENT 3**  
**Table Documenting Changes in Standards and Updated Citations for Indiana ARARs**

**ATTACHMENT 3 - Table Documenting Changes in Standards and Updated Citations for Indiana ARARs**

<b>Source and Description</b>	<b>Former Citation</b>	<b>Current Citation</b>
Air Pollution Control Board. General Provisions for major new sources including ambient air quality standards	326 IAC 1-1	326 IAC 1-3
Air Pollution Control Board. New sources which have the potential to emit 25 tons per year of a hazardous pollutant must apply for a Part 70 permit	326 IAC 1-1	326 IAC 2-1
Air Pollution Control Board. Sets criteria that sources which emit <del>(3 lbs/hour or)</del> * 15 lbs/day of volatile compounds need to register with the Office of Air Management	326 IAC 8-6	
Solid Waste Management Board. Sets requirements for disposal of PCBs at concentrations which exceed 50 ppm and separate requirements for those containing between 2 ppm and 50 ppm.	329 IAC 4	329 IAC 4.1
Water Pollution Control Board. Sets requirements for Water Quality Effluent and includes minimum Surface Water Quality Standards <del>(and Interim Groundwater Quality Standards*)</del> .	327 IAC 1-6 and 2-1-1.5 and 2-1-7	327 IAC 1-6 and 2-1-1.5 (327 IAC 2-1-7 repealed)
Solid Waste Management Board. Solid Waste Management siting and design standards for solid waste land disposal facilities. Prohibits solid waste boundary of new solid waste land disposal facility from wetlands in violation of Section 404 of the Clean Water Act, as amended; and within the floodplain unless the waste is protected from flood water inundation by a dike; and establishes design standards for construction/demolition sites and restricted waste sites.	329 IAC 2-10	329 IAC 10-163
Solid Waste Management Board. Disposal of PCB wastes (same standards as 40 CFR 761).	329 IAC 4	329 IAC 4.1-4
Solid Waste Management Board. Describes the applicability and application requirements for permits.	329 IAC 2-5	329 IAC 10-5-2
Indiana Department of Environmental Management. Provides risk-based voluntary clean-up concentration.	Indiana Department of Environmental Management, Voluntary Remediation Program, 1995.	RISC Technical Resource Guidance Document, September 5, 2000.

\* This portion of the requirement was not included in current updated rule.

**ATTACHMENT 4**  
**Final Report, Baseline Risk Assessment Review**

## ATTACHMENT 4-

### Five-Year Review of the Baseline Risk Assessment for the Continental Steel Superfund Site

The purpose of a five-year review is to determine whether the selected remedy at a site is or will be protective of human health and the environment. As part of the technical review of the remedy, a review of the baseline risk assessment (BRA) is required primarily to address the following question:

Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

This review of the BRA for the Continental Steel Superfund Site (CSSS) is divided into two main sections that focus on the human health risk assessment (Section A) and the ecological risk assessment (Section B). Each review outlines the exposure areas and exposure scenarios that were evaluated in the risk assessment, then answers a series of specific questions about changes in the exposure assumptions, screening criteria, and toxicity values that were employed in the risk assessment. The degree to which the changes increase estimated risks and thereby affect the protectiveness of the established remediation goals; and whether remediation goals need to be modified to maintain protectiveness are evaluated.

#### **A. Baseline Human Health Risk Assessment Review**

The CSSS, which includes a total area of about 183 acres, is composed of a former steel manufacturing facility (Main Plant), a former quarry that was used for disposal of steel processing wastes (Markland Avenue Quarry), former pickling liquor treatment lagoons (Acid Lagoon area), and a Slag Processing Area. Soils in these source areas are contaminated with volatile and Semivolatile organic chemicals, polychlorinated biphenyls, and metals as a result of releases from past operations. Contaminants have migrated from these sources down to groundwater. Groundwater, surface runoff, and past discharges from operations at the Main Plant and Acid Lagoon area have carried site-related contaminants to Kokomo Creek and Wildcat Creek, which border the site.

The site is located in a mixed residential, commercial, and industrial area that is zoned for general use. While land use in the area immediately surrounding most of the site is industrial, the areas adjacent to the Markland Avenue Quarry and east of the Main Plant are residential. Evidence suggests that wind may have carried contaminated soil from the site to nearby residential properties. Although fencing surrounding the Main Plant, the Quarry, and the Acid Lagoon area may discourage trespassing in those areas, it cannot prevent trespassing entirely, especially over the long term. The Slag Processing Area is unfenced, allowing unimpeded access to trespassers. The creeks adjacent to the site are also accessible and may be used recreationally for wading or fishing (though there is a fishing advisory for Wildcat Creek).

In the BHHRA, the site was evaluated as six separate exposure units -- the four source areas described above, Site-Wide Groundwater, and Kokomo and Wildcat Creeks. Based on the existing conditions, the following current/future exposure scenarios were evaluated: a trespasser scenario at all four source areas; a recreational scenario for Kokomo and Wildcat Creeks; and a nearby off-site resident scenario for the Main Plant and the Markland Avenue Quarry. Trespassers who enter any of the on-site source areas could be exposed to soil contamination through direct contact (ingestion and dermal) routes and, to a lesser extent, by inhalation of airborne dust and possibly vapors from higher levels of volatile contaminants in some areas. Trespassers might also come into contact with contaminated water that has accumulated in unfilled portion of the Quarry and in the basements of abandoned buildings within the Main Plant. Recreational users of the creeks may come into direct contact with contaminants in surface water and sediments, and possibly by ingestion of fish caught from the creeks. Off-site residents may be exposed to soil contamination in their yards by direct contact and inhalation routes and, if they have home gardens, by ingestion of produce grown in contaminated soils. Residents might also be exposed to vapors that have infiltrated to indoor air from volatile contaminants in subsurface soil and groundwater.

It is unlikely that groundwater near the site is being used or would be used as a drinking water supply, since the area is served a municipal water supply system that obtains water from upgradient sources. But because such use could

not be ruled out entirely, the BHHRA included a hypothetical residential groundwater use scenario to assess risks that would be associated with potential groundwater use exposures (water ingestion, dermal contact, and inhalation of contaminants released from water to air).

Future use scenarios were selected for the four source areas based on expected or probable future use. For the Markland Avenue Quarry and Slag Processing Area, the BHHRA evaluated both a future residential scenario and a future commercial/industrial scenario, since either use is plausible, and also a construction scenario, since redevelopment for either purpose will involve construction in these areas. Because the Main Plant cannot be converted to residential use due to a covenant in the deed, a future commercial/industrial scenario was assumed along with a construction scenario for redevelopment. For the Acid Lagoon area, which was slated for use as a Corrective Action Management Unit (CAMU), a future commercial/industrial use was assumed. Future on-site residents may be exposed to site contamination by the same routes as current off-site residents. Most of the same routes also apply to future commercial/industrial workers at the site. During redevelopment, construction workers could be exposed to soil contaminants by direct contact and inhalation routes. They might also come into direct contact with contaminated water in the Quarry and in buildings at the Main Plant. It is expected that the water would be removed from those areas during redevelopment, eliminating those potential exposures for future site workers or residents.

Not all of the exposure routes mentioned for the scenarios above were carried through the quantitative assessment. Table A-1 outlines the exposure scenarios that were evaluated in the BHHRA, lists all the exposure routes that were considered, indicates whether or not each route was evaluated quantitatively for each scenario/ location combination, and provides the reasons that routes were eliminated from the quantitative assessment. Generally, direct contact routes were carried through the quantitative assessment (for at least one receptor group) while most other routes were screened out or eliminated for other reasons.

Generally, the exposure input values that were used to calculate exposures for the selected pathways were standard default values recommended by EPA or, in cases where standard default values were not available, conservative estimates based on data and recommendations in EPA's Exposure Factors Handbook (EPA 1997) or other EPA sources. The ages and body sizes of the receptors, as well as the setting and the nature of expected exposures were taken into consideration. Exposure values were selected to reflect the long-term reasonable maximum exposure (RME) and central tendency exposure (CTE) of each receptor group.

**A.1. In the time since the BHHRA was prepared, have there been changes in the site conditions, site setting, or the existing or anticipated land uses at the site? If so, do the changes require that additional pathways or receptor groups be evaluated or that any pathway be re-evaluated using more protective exposure input assumptions in order to avoid underestimating potential risks?**

While current conditions and land uses at the site are the same as described in the BHHRA, alternative future land uses have been proposed for two of the exposure units that were evaluated in the BHHRA, the Main Plant and the Slag Processing Area. For the Main Plant, instead of the future commercial/industrial scenario that was assumed in the BHHRA, conversion of part of this area for recreational use (e.g. park, ball fields) has been proposed. At the Slag Processing Area, where future residential use and commercial/industrial use were both evaluated, development for a firing range is now being considered.

In both cases, potential exposures under the proposed land uses involve the same routes of exposure as the scenarios that were evaluated in the BHHRA (i.e. soil ingestion, dermal contact, and possibly inhalation of airborne contaminants), and it is unlikely the magnitude of exposures under the new scenarios would be any greater than those estimated for future workers and residents in the BHHRA. Even though future visitors to a park could include children, whose rates of intake relative to body weight are generally assumed to be greater than those of adults, the overall exposures and risks of visitors are likely to be less than the estimates for workers at the Main Plant, because their expected exposures would be relatively brief and infrequent compared to standard worker assumptions (five workdays per week, 50 weeks per year for up to 25 years). This would also be true of users of a firing range at Slag Processing Area, since their expected exposures would likely be considerably less frequent than the standard worker or residential assumptions. For a full-time worker at the firing range, potential exposures would be expected to be similar to workers in an industrial setting, and the standard worker exposure assumptions are entirely reasonable.



The risks estimated for these areas and presented in the BHHRA can be considered protective for the alternative uses proposed; therefore further evaluation is not necessary.

**A.2. Have there been changes in the ARARs or TBC values that were used for screening purposes in the COPC selection process for the BHHRA? If so, do the changes include lower screening values that lead to the identification of additional COPCs in any of the exposure media? Are risks associated with newly identified COPCs greater than acceptable target levels?**

In the BHHRA, various screening criteria were used to identify COPCs for the following exposure media and exposure areas: soil in the four on-site source areas and the two adjacent off-site residential areas, surface water in the Markland Avenue Quarry and in Kokomo and Wildcat Creeks, sediment in Kokomo and Wildcat Creeks, and site-wide groundwater in the shallow, intermediate, and lower aquifer. The screening criteria were either risk-based concentrations or regulatory criteria considered to be health-protective. Generally, if the maximum detected concentration of a chemical in a given exposure medium and location was greater than its screening value, the chemical was identified as a COPC, otherwise it was screened out. In some cases, chemicals with concentrations exceeding screening criteria were eliminated because the detection frequency was low, the concentrations were similar to background levels, or the chemical was not site-related.

In the time since the BHHRA was completed, some of the risk-based screening values have been revised (due to revised toxicity estimates) and some regulatory criteria have become obsolete, replaced by different criteria. Changes in the screening criteria and the effects on COPC selection for each exposure medium are discussed below. Although exposure point concentrations and associated risks could not be reliably calculated for added COPCs without the original data sets, worst-case risks have been estimated from the maximum concentrations. Except for arsenic in shallow groundwater (see discussion below), the risks associated with newly identified COPCs appear to be below levels of concern and negligible in comparison to the risk estimates already included in the BHHRA.

**Soil**

The screening criteria used for most chemicals in soil were adapted from the risk-based concentrations (RBCs) developed by EPA Region III (EPA 1996) for residential soils or commercial/industrial soils. The Region III RBCs were calculated using either a target cancer risk of  $1 \times 10^{-6}$  (the low end of the risk range regarded as acceptable by EPA) or a hazard index (HI) for non-carcinogens of 1 (the benchmark below which non-cancer risks would not be expected). To minimize the chance of overlooking any significant risks, the EPA Region III values were reduced by a factor of 10 for screening, to concentrations corresponding to either a cancer risk of  $1 \times 10^{-7}$  or an HI of 0.1. Residential soil screening values were applied to exposure areas where land use is currently residential (off-site areas near the Main Plant and Markland Avenue Quarry) or where future land use might be residential (Markland Avenue Quarry and Slag Processing Area). Commercial/industrial soil screening values were applied to the remaining exposure areas (Main Plant and Acid Lagoon area). Note that the screening values used for lead and polychlorinated biphenyls in soil in the BHHRA were not based on RBCs, but were obtained from EPA soil screening guidance (EPA 1994).

Since the BHHRA was completed, there have been revisions to the EPA Region III RBCs (EPA 2002a) reflecting additions or changes in the toxicity values for some chemicals. The risk-based screening values have changed accordingly. Tables A-2 and A-3 list all chemicals that were detected in soils in the "residential soil" areas and the "non-residential soil" areas, respectively, and indicate where screening values have been added or where current risk-based screening values are more stringent (lower) than the original screening values. The tables also indicate where chemicals that were previously screened out would now be included as COPCs as a result of the revisions to screening values.

Table A-2 for "residential soils" indicates that the only COPCs to be added as a result of more stringent screening values are chromium and Aroclor 1254 in the residential area near the Quarry. The maximum chromium concentration (38 mg/kg) is less than twice as great as its current screening concentration (23 mg/kg based on a target HI of 0.1 for hexavalent chromium), which indicates that the HI associated with chromium exposure would be less than 1, the benchmark for possible non-cancer effects. The maximum concentration of Aroclor 1254 (0.68 mg/kg) is about 20 times greater than current screening concentration (0.032 mg/kg based on a target cancer risk of  $1 \times 10^{-7}$  for residential exposure). This comparison indicates that the estimated cancer risk to a resident from exposure to Aroclor 1254 at that level would be about  $2 \times 10^{-6}$ , which is well within the acceptable range.

The situation is similar for "non-residential soils". Table A-3 shows that while screening values for 14 of the chemicals detected are now more stringent, the only COPCs to be added as a result are Aroclor 1254 at the Acid Lagoon area and trichloroethene (TCE) at the Acid Lagoon area and the Main Plant. The maximum concentration of Aroclor 1254 detected in the Acid Lagoon area (0.55 mg/kg), less than twice the current industrial soil screening concentration for PCBs (0.29 mg/kg), indicating that the associated cancer risk to future site workers would be less than  $1 \times 10^{-6}$ . The maximum concentration of TCE detected in the Acid Lagoon area (22 mg/kg) is about 16 times greater than its current screening value (1.4 mg/kg based on a target cancer risk of  $1 \times 10^{-7}$ ), indicating that the associated cancer risk to workers would be about  $2 \times 10^{-6}$ , again within the acceptable range. The estimated cancer risk to workers from TCE in soil at the Main Plant, at a maximum concentration of 5.6 mg/kg, would be less than  $1 \times 10^{-7}$ .

#### ***Surface Water***

According to the BHHRA, chronic water quality criteria from Indiana Water Quality Regulations or Federal chronic ambient water quality criteria were used as screening criteria for surface water. Generally, the surface water screening values that are listed in the BHHRA do not match current water quality criteria.

Of the water quality criteria that are currently available, the human health values for non-drinking water from ambient water quality standards developed by Indiana's Office of Water Quality seem most appropriate for screening surface water contaminants for the BHHRA. In cases where non-drinking values have not been established, drinking water standards were used for screening.

Table A-4 lists all chemicals that were detected in surface water, either in the Markland Avenue Quarry or in Kokomo and Wildcat Creeks, and identifies which chemicals now have lower screening values. Although current surface water screening values for ten chemicals are lower than the original screening values, they are still greater than the maximum concentrations reported in surface water samples.

#### ***Sediment***

Because there were no human health-based criteria available for sediment, the residential soil screening values were used to screen chemicals in sediment. Table A-5 lists all the chemicals that were detected in sediment and indicates which chemicals now have new or more stringent soil screening values. Despite changes in the screening values for 14 chemical, no new COPCs were identified in sediment as a result.

#### ***Groundwater***

Chemicals concentrations detected in groundwater in the shallow, intermediate, and lower zones were compared to available drinking water MCLs and risk-based screening values that were based on EPA Region III RBCs for tap water (concentrations reduced by a factor of 10 for screening). Generally, a chemical was identified as COPC if the maximum detected concentration was greater than its risk-based screening concentration and its drinking water MCL (if an MCL had been established). Since the BHHRA was completed, there have been revisions to the tap water RBCs reflecting additions or changes in the toxicity values for some chemicals, and risk-based screening values have changed accordingly. MCLs are currently the same as they were when the BHHRA was completed, but since the MCL for arsenic will soon drop from 0.05 mg/L to 0.01 mg/L (EPA 2001a), the lower value should be used for screening. Table A-6 lists all chemicals detected in any of the three groundwater zones and indicates which currently have more stringent screening criteria and where additional COPCs are identified as a result.

In shallow groundwater, added COPCs include arsenic (due to the lower MCL) and cobalt (due to a lower risk-based screening value). The maximum concentration of cobalt (0.13 mg/L) is less than twice as great as the tap water screening value (0.073 mg/L based on a target HI of 0.1), indicating that the associated HI from exposure to this level in drinking water would be below a level of concern. On the other hand, the maximum concentration of arsenic (0.014 mg/L) is about 3000 times greater than its risk-based screening value (0.0000045 mg/L based on a target cancer risk of  $1 \times 10^{-7}$ ), indicating that the associated cancer risk from exposure to this level in drinking water would be about  $3 \times 10^{-3}$ , exceeding the risk range that is generally regarded as acceptable ( $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ ). Although the actual exposure point concentration for arsenic in shallow groundwater would likely be lower than the maximum, this analysis suggests arsenic levels in shallow groundwater zone could potentially pose an unacceptably high cancer risk and could be significant contributor to the total risks estimated for use of shallow groundwater.

Table A-6 indicates that there are no additional COPCs in the intermediate zone, but that acetone and naphthalene should be identified as COPCs in the lower groundwater zone, due to lower risk-based screening values. The maximum concentration of acetone (0.24 mg/L) and the maximum concentration of naphthalene (0.003 mg/L) detected in the lower zone are less than five times their respective screening concentrations, which are both based on a target HI of 0.1, indicating that HIs associated with potential exposures to these chemicals would be below a level of concern.

**A.3. For chemicals of potential concern (COPCs) identified and evaluated in the BHHRA, have new toxicity values been introduced or have the original toxicity values been revised in the direction of greater toxicity (i.e. to higher cancer slope factors or to lower reference doses)? If so, are estimated risks associated with a newly introduced toxicity value or the increases in risk associated with a revised toxicity value significant (i.e. greater than the selected target risk level)?**

The cancer slope factors (SFs) and noncancer reference doses (RfDs) for site COPCs that were used in the BHHRA are listed in Tables A-7 and Tables A-8, respectively, along with current toxicity values that were developed after the BHHRA was completed. The sources of all toxicity values are referenced in these tables. The preferred source of toxicity values is EPA's Integrated Risk Information System (IRIS; EPA 2002b), a database of up-to-date toxicity information that contains EPA-verified SFs and RfDs, meaning that the data and procedures used in their derivation have been thoroughly reviewed and approved by Agency Workgroups. Toxicity values from other EPA sources may be used to evaluate COPCs when values from IRIS are not available, but it should be recognized that these provisional RfDs and SFs have not undergone the same rigorous review process as EPA-verified values.

In cases where a new toxicity value has been introduced or where the current value represents an increase in toxicity, Tables A-7 and A-8 indicate that further evaluation is required. Accordingly, risks associated with the following should be calculated or recalculated:

- Higher oral SFs for benzene and TCE (oral and dermal exposures)
- Higher inhalation SFs for tetrachloroethene (PCE) and TCE
- New oral RfDs for 1,2-dichloroethene, 2-methylnaphthalene, benzene, iron, and vinyl chloride; and lower oral RfDs for benzene, beryllium, and TCE (oral and dermal exposures)
- New inhalation RfDs for beryllium and vinyl chloride, and lower inhalation RfDs for 1,2-dichloroethane and chloroform.

The COPCs identified in soil, surface water, sediment, and groundwater in the various exposure units and carried through the quantitative assessment were reviewed to determine which exposures would be affected by the toxicity changes described above. The results are discussed by exposure medium below.

#### **Soil**

A review of the COPCs identified for surface soil exposures on-site and off-site areas shows that the soil COPCs for the Main Plant, the Markland Avenue Quarry, and the Slag Processing do not include any of the chemicals requiring re-evaluation for toxicity changes.

At the Acid Lagoon area, iron and beryllium are among the soil COPCs that were identified. With regard to beryllium, the dust inhalation route for soils was not carried through the quantitative assessment, but was screened out by showing that dust concentrations measured at the Main Plant were too low to pose any significant cancer risk from the levels of contamination present in the soil (see Appendix C-2 of the BRA). A similar analysis can be applied to the potential risk from inhalation of beryllium in soil at the Acid Lagoon area. With a beryllium concentration of 0.713 mg/kg in soil (the exposure point concentration calculated for the RME case), and an acceptable concentration for beryllium in air of  $7 \times 10^{-4} \mu\text{g}/\text{m}^3$  (from the EPA Region 3 RBC table), the acceptable concentration of respirable dust in air would be:

$$C_{a-dust} = C_{a-Bc} / (C_{s-Bc} \times CF)$$

where

$$C_{a-dust} = \text{acceptable respirable dust concentration air } (\mu\text{g}/\text{m}^3)$$

$C_{a-Bc}$  = acceptable concentration for beryllium air =  $7 \times 10^{-4} \mu\text{g}/\text{m}^3$   
 $C_{s-Bc}$  = beryllium concentration in soil =  $0.713 \text{ mg}/\text{kg}$   
 CF = conversion factor =  $10^{-6} \text{ kg}/\text{mg}$

$$C_{a-dust} = (7 \times 10^{-4} \mu\text{g}/\text{m}^3) / (0.713 \text{ mg}/\text{kg} \times 10^{-6} \text{ kg}/\text{mg}) = 980 \mu\text{g}/\text{m}^3$$

The highest concentration of total airborne dust measured at the Main Plant was  $63 \mu\text{g}/\text{m}^3$ , well below the calculated respirable dust concentration that would be protective for beryllium. Assuming that airborne dust levels at the Acid Lagoon area are similar to the levels at the Main Plant, the risks associated with inhalation of beryllium would be well below levels of concern.

With regard to potential non-cancer health risks from exposure to iron in the Acid Lagoon area, the receptor group with the greatest estimated exposure was trespassers. Under the RME case, their estimated chronic daily intake of iron from incidental ingestion of soil with an iron concentration of  $211,000 \text{ mg}/\text{kg}$  was  $0.273 \text{ mg}/\text{kg}\cdot\text{day}$ . (See Appendix D in the BRA for details of the intake calculation. Dermal exposures to iron, expected to be minor compared to ingestion, were not estimated in the BHHRA). The HI is calculated as:

$$HI = CDI / RfDo$$

where

CDI = chronic daily intake ( $\text{mg}/\text{kg}\cdot\text{day}$ )

RfDo = oral reference dose ( $\text{mg}/\text{kg}\cdot\text{day}$ )

Using the estimated RME intake and the new provisional oral RfD for iron, the HI would be:

$$HI = (0.273 \text{ mg}/\text{kg}\cdot\text{day}) / (0.3 \text{ mg}/\text{kg}\cdot\text{day}) = 0.9$$

The HI for iron is less than 1.0, indicating that this exposure is unlikely to cause any adverse health effects. (Dose additivity from other chemicals is not an issue the associated critical effect, iron overload, does not apply to any other COPCs.) The risk estimates for soil are not significantly increased by toxicity changes.

#### *Surface water*

Potential exposures to surface water contamination in Kokomo and Wildcat Creeks from incidental ingestion was evaluated for recreational receptors. (Dermal contact was not evaluated on the grounds that exposure would likely be sporadic and brief, and minor in comparison to the ingestion route.) Of the COPCs in surface water at Kokomo and Wildcat Creeks, the only one affected by a toxicity change is iron, which has a new provisional oral RfD. With an exposure concentration of  $0.49 \text{ mg}/\text{L}$  under the RME case, the estimated intake for trespassers was  $1.66 \times 10^{-4} \text{ mg}/\text{kg}\cdot\text{day}$ . The HI calculated for iron ingestion from the new RfD is

$$HI = (1.66 \times 10^{-4} \text{ mg}/\text{kg}\cdot\text{day}) / (0.3 \text{ mg}/\text{kg}\cdot\text{day}) = 5.5 \times 10^{-4}$$

This value is well below the 1.0 benchmark, indicating that no adverse health effect would be expected.

Potential exposures to surface water from ingestion and dermal contact were evaluated for trespassers at the Markland Avenue Quarry. Among the COPCs identified in surface water at the Quarry is TCE, which now has a lower oral RfD and a higher oral SF. (Note that these are all provisional toxicity values that have not been verified by EPA.) Table A-9 shows the effect of the revised toxicity values on the estimated risks to trespassers from exposure to TCE and on total estimated risks. The HI for noncancer effects is calculated by dividing estimated intake by the oral RfD (in exactly the same way as shown for iron above). The cancer risk is calculated by multiplying the intake and the SF together.

$$\text{Cancer risk} = LADI \times SFo$$

where

LADI = lifetime average daily intake

SFo = oral slope factor

For TCE in surface water at the Quarry:

$$\text{Cancer risk} = 3.84 \times 10^{-4} \text{ mg/kg-day} \times 0.4 (\text{mg/kg-day})^{-1} = 1.5 \times 10^{-4}$$

As Table A-9 shows, the 20-fold decrease in the oral RfD for TCE increased the estimated HI from 0.56 to 11. The new HI is greater than the benchmark of 1.0, indicating a possibility of non-cancer health effects. Similarly, due to a 36-fold increase in the SF, the estimated cancer risk for TCE increased from  $4.2 \times 10^{-6}$  to  $1.5 \times 10^{-4}$ . The new estimate of cancer risk is slightly above the range generally regarded as acceptable by EPA.

It should be noted that the exposure point concentration used for TCE, 3.4 mg/L, is the maximum concentration that was detected in 13 surface water samples from the Quarry. The actual long-term average exposure concentration for TCE may be considerably lower than this maximum. Note also that the estimated dermal absorption of TCE, which is more than 6 times greater than the estimated exposure from ingestion, may be a gross overestimate. Dermal exposure was calculated in the BHHRA using a dermal permeability constant (PC) of 0.23 cm/hr (derived from measurements in animals), rather than the lower modeled value of 0.016 cm/hr that was recommended in EPA's 1992 dermal guidance (EPA 1992). Given the uncertainties associated with the dermal exposure estimates for TCE and the likelihood that actual exposures are at least an order of magnitude lower, the TCE in surface water at the Quarry probably does not pose any real health threat to site trespassers.

#### ***Sediment***

Potential exposures of recreational receptors to contaminants in creek sediments through incidental ingestion and dermal contact routes (for PAHs and PCBs) were evaluated for six separate reaches in Kokomo and Wildcat Creek. The same COPCs were evaluated for all six reaches. Since the highest risks associated with sediment exposures were reported for Reach 4 (the segment of Kokomo Creek that runs through the south end of the Main Plant), and the lowest risks were associated with Reach 6 (Wildcat Creek upstream of the Main Plant, these two creek segments were selected to demonstrate the impact of toxicity increases. Tables A-10 and A-11 shows the effects of the revised toxicity values on the estimated risks to recreational users of the creeks from oral and dermal exposures to the COPCs in sediment at Reach 4 and Reach 6, respectively. Four COPCs were affected: beryllium, which now has a lower RfD than previously; and 2-methylnaphthalene, iron, and vinyl chloride, for which new RfDs have been developed. Both tables show that the HIs associated with the affected COPCs in sediment are all below the 1.0 benchmark, and that the effect on the total HI (from all COPCs in sediment) is minor.

#### **Groundwater**

The highest of the potential risks posed by groundwater contamination are associated with its hypothetical use as a residential water supply, with exposures occurring through water consumption, dermal contact during baths or showers, and inhalation of contaminants released to indoor air. Although the text of the BHHRA explains that exposures and risks were calculated well by well and results were mapped to show the variability and spatial distribution of risks in each of three groundwater zones (shallow, intermediate, and lower), Appendix D includes just one set of exposure/risk calculations for each groundwater zone. The groundwater exposure point concentrations were presumably calculated using the data from all of the wells in each of the respective zones. Using the RME cases from those risk calculations, Tables A-12, A-13, and A-14 show the impact of the new and revised toxicity values on the estimated risks associated with residential use of the shallow zone, the intermediate zone, and the lower zone, respectively. Current risk estimates are presented alongside the original risk estimates for the affected COPCs. Significant increases in risk are highlighted in bold print.

The greatest increases in estimated non-cancer risks from use of shallow zone groundwater are associated with oral and dermal exposure to iron and TCE, which together now account for more than 70% of the total HI. The oral/dermal HI calculated for iron (at an exposure concentration of 1,200 mg/L in shallow groundwater) is 250, and the oral/dermal HI for TCE (at a concentration of 0.959 mg/L) is now 200, both many times greater than the benchmark of 1.0 for potential non-cancer effects. The oral/dermal HI for vinyl chloride and the inhalation HI for chloroform, although greater than 1.0, are minor contributors to the total HI for shallow groundwater use. Due to the higher SFs for TCE, the cancer risks associated with exposures to TCE in shallow groundwater also increased significantly, to  $5.9 \times 10^{-3}$  for the oral/dermal routes and  $3.2 \times 10^{-3}$  for the inhalation route, well above the  $10^{-6}$  to  $10^{-4}$  range that is generally regarded as acceptable. TCE alone now accounts for more than 70% of the total cancer risk estimated for use of shallow groundwater.

The greatest increases in the estimated risks for use of groundwater from the intermediate and lower zones are associated with TCE. Based on the previous estimates, the risks posed by TCE in both zones were already unacceptably high. At a TCE concentration of 9.8 mg/L in the intermediate zone, the cancer risks for oral/dermal and inhalation exposures are now  $6 \times 10^{-2}$  and  $3.2 \times 10^{-2}$ , respectively, while the HI for oral/dermal exposure is now 2,000. HIs greater than 1.0 for iron and vinyl chloride suggest a possibility of non-cancer effects from those chemicals also, but much less than from TCE. Compared to the intermediate zone, the TCE concentration and associated risks in the lower zone are about half as great, with cancer risks of  $2.9 \times 10^{-2}$  and  $1.6 \times 10^{-2}$ , respectively, and an oral/dermal HI of 1,000. TCE now accounts for the bulk of the total risks, both cancer and non-cancer, in both the intermediate and lower groundwater zones.

**A.4. Are the existing remediation goals (presented in the feasibility study) still adequately protective of human health or should new remediation goals be developed in light of the additional risks associated with newly identified COPCs or revision of toxicity values?**

There is no need to revise existing remediation goals for soil, surface water, and sediment, since the estimated risks for these media were not significantly increased as a result of the changes in toxicity estimates or screening criteria used in the BHHRA. Only groundwater risks were significantly impacted by these changes.

Based on the original risk estimates for groundwater use, remediation goals were set for the following chemicals: acrylonitrile, PCBs, 1,1-dichloroethene, 1,2-dichloroethene benzene, manganese, chloroform, methylene chloride, PCE, TCE, and vinyl chloride. In most cases, drinking water MCLs were adopted as the remediation goals. Since manganese has no MCL, the secondary MCL (which is based on aesthetic rather than health considerations) was adopted as the remediation goal. For acrylonitrile, which has no MCL or secondary MCL, a risk-based remediation goal was calculated based on residential water use assumptions. Because there have been substantial changes in toxicity values for TCE, with corresponding increases in the estimated risks, evaluation of the established remediation goal for TCE in groundwater is necessary to ensure that it is still adequately protective. Remediation goals should also be established for arsenic and iron in groundwater, because the estimated risks associated with these chemicals, which were not included in the BHHRA, exceed acceptable levels.

***New goal for arsenic in groundwater***

A remediation goal was not established for arsenic, because arsenic was not originally identified as a COPC in groundwater. Since arsenic has been now identified as a COPC in shallow groundwater and the potential risks from exposure appear to be significant, a remediation goal should now be established for arsenic in groundwater. The exposure assumptions for oral and dermal exposure outlined in the BHHRA can be used to calculate arsenic exposure and associated risks from groundwater use, assuming that the new MCL for arsenic (0.01 mg/L) is adopted as the remediation goal. Since dermal intake during showering was assumed to be equal to 30% of the intake by ingestion, using RME assumptions for the adult resident, the cancer risk from oral and dermal exposure would be calculated as:

$$\text{Cancer risk} = 1.3 \times \frac{(C_w \times IR_{w-a} \times EF \times ED)}{BW_a \times AT_c} \times SFO$$

where

$C_w$  = contaminant concentration in water (mg/L)  
 $IR_{w-a}$  = adult ingestion rate for drinking water (2 L/day)  
 $EF$  = exposure frequency (350 days/year)  
 $ED$  = exposure duration (30 years)  
 $BW_a$  = adult body weight (70 kg)  
 $AT_c$  = averaging time for cancer, 70-year lifetime (25,550 days)  
 $SFO$  = oral slope factor

The oral/dermal cancer risk for arsenic exposure at a concentration equal to the new MCL is:

$$\text{Cancer risk (oral/dermal)} = 1.3 \times \frac{0.010 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/year} \times 30 \text{ years}}{70 \text{ kg} \times 25,550 \text{ days}} \times 0.4 \text{ (mg/kg-day)}^{-1}$$

$$= 6.1 \times 10^{-5}$$

The estimated cancer risk for arsenic at the MCL is within the acceptable range.

For non-cancer effects based on RME assumptions for the resident child, the HI from oral/dermal exposure would be calculated as:

$$HI \text{ (oral/dermal)} = 1.3 \times \frac{(C_w \times IR_{w-c} \times EF \times ED)}{RfDo \times (BW_c \times AT_c)}$$

where

$C_w$  = contaminant concentration in water (mg/L)

$IR_{w-c}$  = child ingestion rate for drinking water (0.8 L/day)

$EF$  = exposure frequency (350 days/year)

$ED$  = exposure duration (6 years)

$BW_c$  = child body weight (16 kg)

$AT_c$  = averaging time for non-cancer, equivalent to ED (2190 days)

$RfDo$  = oral reference dose

The oral/dermal HI for arsenic exposure at a concentration equal to the new MCL is:

$$HI \text{ (oral/dermal)} = 1.3 \times \frac{(0.010 \text{ mg/L} \times 0.8 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years})}{(16 \text{ kg} \times 2190 \text{ days})}$$

$$(3.0 \times 10^{-4} \text{ mg/kg-day})$$

$$= 2.1$$

The HI above 1 for children suggests a slight possibility of adverse non-cancer health effects, but this does not necessarily mean that health effects would occur from exposure to arsenic at the MCL level. Note that there are relatively large uncertainties associated with both the exposure and toxicity components of the risk estimate and, therefore, that these estimates are made using a combination of deliberately conservative (health-protective) assumptions in order to avoid underestimating the true risks. The result is likely an overestimate of the true risks. Since the estimated HI for arsenic at the MCL is only two times EPA's benchmark, while the associated uncertainty may be many times greater, it is difficult to justify a remediation goal for arsenic lower than the MCL.

#### ***New goal for iron in groundwater***

No remediation goal was set for iron in the FS, because no risks were calculated for iron exposure in the BHHRA. With the newly developed RfD for iron, the HI calculated for iron in shallow groundwater was above the acceptable level. Currently, there is no MCL for iron, but there is a secondary MCL of 0.3 mg/L. Assuming that, as was done for manganese, the secondary MCL is adopted as the remediation goal for iron in shallow groundwater, the non-cancer risk would be:

$$HI \text{ (oral/dermal)} = 1.3 \times \frac{(0.3 \text{ mg/L} \times 0.8 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years})}{(16 \text{ kg} \times 2190 \text{ days})}$$

$$(0.3 \text{ mg/kg-day})$$

$$= 0.06$$

well below the 1.0 benchmark. The secondary MCL for iron is more than adequately protective. From a health standpoint, the remediation goal for iron in groundwater could be set at a higher level that would still be adequately protective, possibly up to as much as 5 mg/L

$$HI \text{ (oral/dermal)} = 1.3 \times \frac{(5 \text{ mg/L} \times 0.8 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years})}{(16 \text{ kg} \times 2190 \text{ days})}$$

$$(0.3 \text{ mg/kg-day})$$

$$= 1.0$$

#### ***Evaluation of the goal for TCE in groundwater***

The remediation goal for TCE in groundwater was set at the MCL of 0.005 mg/L. The cancer risk from oral/dermal exposure to TCE at this concentration would be:

$$\begin{aligned}\text{Cancer risk (oral/dermal)} &= 1.3 \times \frac{(0.005 \text{ mg/L} \times 2 \text{ L/day} \times 350 \text{ days/year} \times 30 \text{ years})}{70 \text{ kg} \times 25,550 \text{ days}} \times 0.4 (\text{mg/kg-day})^{-1} \\ &= 1.3 \times (5.87 \times 10^{-5} \text{ mg/kg-day}) \times 0.4 (\text{mg/kg-day})^{-1} = 3.1 \times 10^{-5}\end{aligned}$$

Since intake from inhalation of TCE vapors was assumed to be 70% of the oral intake,

$$\text{Cancer risk (inhalation)} = 0.7 \times (5.87 \times 10^{-5} \text{ mg/kg-day}) \times 0.4 (\text{mg/kg-day})^{-1} = 1.6 \times 10^{-5}$$

The estimated total cancer risk for TCE in drinking water at the MCL is:

$$\text{Cancer risk (total)} = (3.1 \times 10^{-5}) + (1.6 \times 10^{-5}) = 4.7 \times 10^{-5}$$

With regard to the non-cancer risk, the oral/dermal HI calculated for of TCE in drinking water at the MCL is:

$$\begin{aligned}\text{HI (oral/dermal)} &= 1.3 \times \frac{(0.005 \text{ mg/L} \times 0.8 \text{ L/day} \times 350 \text{ days/year} \times 6 \text{ years})}{(16 \text{ kg} \times 2190 \text{ days})} \\ &\quad (3.0 \times 10^{-4} \text{ mg/kg-day}) \\ &= 1.3 \times (2.4 \times 10^{-4} \text{ mg/kg-day}) / (3.0 \times 10^{-4} \text{ mg/kg-day}) = 1.0\end{aligned}$$

and the HI for inhalation of TCE is:

$$\text{HI (inhalation)} = 0.7 \times (2.4 \times 10^{-4} \text{ mg/kg-day}) / (1.0 \times 10^{-2} \text{ mg/kg-day}) = 0.02$$

giving a total HI of 1.0. Since the risks estimated for TCE in drinking water at the MCL do not exceed the levels regarded as acceptable by EPA, this remediation goal appears to be just adequately protective. Note that both the old and new risk estimates for TCE are based on provisional toxicity values that have not gone through the EPA's extensive review process for verification.

#### **A.5 BHHRA Review Summary**

The BHHRA was reviewed to determine whether changes in site conditions, screening criteria, or toxicity values that have occurred since the risk assessment was completed would increase the risks previously estimated or introduce additional risks not previously considered, and whether the established remediation goals require modification as a result. Although there were increased risks associated with toxicity changes for a number of COPCs and additional COPCs identified using new screening criteria, they were not significant in most cases. Only risks associated with groundwater use were significantly impacted.

Risks associated with potential exposure to TCE in groundwater increased substantially due to the revisions of the SFs and the oral RfD. Nevertheless, the remediation goal for TCE, which was set at the drinking water MCL of 0.005 mg/L, still appears to be adequately protective. In shallow groundwater, risks associated with exposures to iron and arsenic, which were not evaluated in the original assessment, are estimated to be above acceptable levels. The new MCL for arsenic of 0.010 mg/L should be adopted as remediation goal for groundwater, consistent with the goals already established. The remediation goal for iron in groundwater could be set at its secondary MCL of 0.3 mg/L (as was done for manganese) or a higher risk-based value up to 5 mg/L.



## **B. Baseline Ecological Risk Assessment Review**

The potential for adverse impacts on ecological receptors at the CSSS was evaluated in a baseline ecological risk assessment (BERA). The site was divided into five exposure areas, which were also evaluated in the BHHRA. These exposure areas include the Main Plant, Acid Lagoon area, Slag Processing Area, Markland Avenue Quarry, and Kokomo and Wildcat Creeks. A biological assessment provided information on terrestrial and aquatic ecological receptors present at the CSSS, including the potential presence of threatened and endangered species. Based on the biological assessment, exposure scenarios were developed for the omnivorous American robin, piscivorous great blue heron, piscivorous mink, and insectivorous Indiana bat, a state and federally listed endangered species. The American robin was assumed to be exposed to COPCs in surface soil in the Main Plant, Acid Lagoon area, Markland Avenue Quarry, and Slag Processing Area while the great blue heron, mink, and Indiana bat were assumed to be exposed to COPCs in sediment from Kokomo and Wildcat Creeks. Uptake of COPCs occurs directly through ingestion of contaminated soil or sediment and indirectly through ingestion of food items living in contaminated media (i.e., earthworms, insects, fish).

Standard default exposure parameters recommended by the EPA, such as body weight and ingestion rate, were combined with maximum COPC concentrations to estimate exposures to ecological receptors. However, chemical-specific factors used in estimating exposures and toxicity data have been updated since the BERA was completed. These chemical-specific factors and other components of the BERA were reviewed to determine if updated information leads to unacceptable impacts to ecological receptors at the CSSS. Criteria used to select COPCs were reviewed and updated; changes in site conditions, receptors, exposure pathways, and assumptions are identified; and chemical toxicity values were updated. In addition, RAOs were reviewed to determine if revisions are necessary because of new or revised information.

**B.1. In the time since the BERA was prepared, have there been changes in the site conditions, site setting, or the existing or anticipated land uses at the site? If so, do the changes require that additional pathways or receptor groups be evaluated or that any pathway be re-evaluated using more protective exposure input assumptions in order to avoid underestimating potential risks?**

Current land uses and conditions at the site are not significantly different from those described in the BERA. However, as described in Section A of this memorandum, proposed future land uses for the Main Plant and Slag Processing Area have changed. A recreational area is being considered for the Main Plant and a firing range is being considered for the Slag Processing Area. The proposed changes in *future* land use for both areas are not expected to have any greater impact on receptors of concern than the future land use plans previously evaluated in the BERA.

The presence or occurrence of ecological receptors previously observed at the CSSS could not be updated without a site visit. According to the U.S. Fish and Wildlife Service, the Indiana bat (*Myotis sodalis*) is still listed as an endangered species that is present in the general vicinity of the CSSS.

No other changes in site conditions have been documented that would lead to an underestimation of risks posed to ecological receptors at the CSSS.

**B.2. Have there been changes in the ARARs or TBC values that were used for screening purposes in the COPC selection process for the BERA? If so, do the changes include lower screening values that lead to the identification of additional COPCs in any of the exposure media? Are risks associated with newly identified COPCs greater than acceptable target levels, requiring the establishment of new remediation goals?**

The CSSS BERA used the following criteria for selection of COPCs: (1), the frequency of detection must be greater than 5% of the samples; (2), the maximum detected concentration must exceed a maximum background concentration; (3), the chemical must be toxic to ecological receptors and the maximum detected concentration must exceed a minimum benchmark value for potential adverse effects; and (4), the chemical must be site-related. For this review, chemicals were re-screened using updated benchmark values (criteria number three). ARARs and receptor-specific benchmarks may be used to screen chemicals detected onsite. No ecological receptor-specific

ARARs are provided by IDEM although updated ARARs based on human health protection are provided in Section A of this memorandum. Benchmark values that are now more restrictive for COPCs, for each exposure area for soil, sediment, and surface water are listed in Tables B-1 through B-3 and are briefly described below.

**Surface Soil Criteria:** The criteria used to select COPCs for surface soil included benchmarks for terrestrial plants, earthworms, and soil microorganisms (Will and Suter 1995). These criteria have since been updated by Efroymson et al. (1997a and 1997b). Level B criteria established by the British Columbia Ministry of the Environment – Canada (1989) were used as secondary benchmarks and have since been updated (1995). When benchmarks used in the BERA could not be confirmed and updates from the above sources were not available, updated values were obtained from EPA Region 4 “Recommended Ecological Screening Values for Soil” (Friday 1998). Table B-1 presents soil criteria that are more restrictive for each source area. Anthracene, fluoranthene, pyrene, phenanthrene, mercury, and toluene were previously below benchmark values but now exceed the updated benchmark values.

**Sediment Criteria:** EPA sediment quality criteria (1993) were used to select COPCs for sediment. Secondary sources of benchmarks used to select COPCs for the CSSS BERA were values provided by the Ontario Ministry of the Environment (1993), the National Oceanic and Atmospheric Administration (NOAA; 1994), and the New York Department of Conservation (NYDEC; 1993). Benchmarks for sediment were updated using alternate EPA sources compiled in the Risk Assessment Information System (RAIS) (ORNL 2002). Included in RAIS are EPA’s Office of Solid Waste and Emergency Response (OSWER) and EPA Region IV sediment benchmarks. When benchmarks were not available from these sources, NOAA’s Screening Quick Reference Tables (SQRT; Buchman 1999) and values provided by Jones et al. (1997) were used. Table B-2 presents sediment criteria that are more restrictive for each source area. There are no new COPCs for sediment based on updated screening benchmarks.

**Surface Water Criteria:** Indiana Water Quality Standards (IWQS) were used in the CSSS BERA to identify COPCs in surface water. Secondary benchmark values used were federal ambient water quality concentrations for chronic exposure (EPA 1992) and “lowest chronic value” for daphnids or fish from Suter et al. (1992). All sources of screening levels have been updated (IDEM 2001; EPA 1999a; and Suter and Tsao 1996). The updated criteria were used to screen chemicals detected at the CSSS, using the same order of priority. Table B-3 provides surface water criteria that are more restrictive for each source area. Barium, magnesium, and trichloroethene were previously below benchmark values but now exceed the updated benchmark values.

The CSSS BERA considered only PCBs and mercury as COPCs that may bioaccumulate. Current ecological risk assessment methodology (EPA 2001) considers all chemicals with a log  $K_{ow}$  (log of the octanol – water partition coefficient) greater than 3.5 as having the potential to bioaccumulate. These chemicals are all included as COPCs, provided that the maximum chemical concentration is greater than the maximum background concentration and is detected in more than 5% of the samples. Using this new criterion, many semi-volatile organic compounds (SVOCs) were added to the list of COPCs for each exposure area. Table B-4 lists bioaccumulative COPCs for each exposure area that have a log  $K_{ow}$  greater than 3.5. New COPCs are shown in bold type.

Based on the review of updated screening benchmarks, many of the newly identified COPCs likely would contribute to risk estimates greater than the HQ benchmark of one. The BERA revealed elevated risks for exposure of ecological receptors to chemicals similar to the newly identified COPCs (SVOCs, metals, VOCs), but these risks were not addressed in cleanup decisions for the CSSS. Cleanup levels for SVOCs, metals, and PCBs for surface soil and sediment for each exposure area were based on results from the BHHRA or background concentrations. Some, but not all, of these cleanup goals also were protective for the ecological receptors evaluated in the BERA. It is not clear why cleanup goals protective of ecological receptors were not developed for all of the COPCs estimated to pose significant risks in the BERA. However, since significant ecological risks were identified in the BERA but not addressed in the ROD, it does not appear that developing cleanup goals for additional similar COPCs would serve a useful purpose.

**B.3. For COPCs identified and evaluated in the BERA, have new chemical-specific factors or toxicity values been introduced or have the original values been revised in the direction of greater toxicity (i.e. to greater transfer factors or lower reference toxicity values)? If so, are estimated risks associated with a newly introduced value or the increases in risk associated with a revised value significant (i.e. lead to exceedance of**

the target risk level)? Is it necessary to develop new remediation goals or revise existing remediation goals for any medium as a result of the increases in toxicity estimates?

Bioaccumulation factors for soil invertebrates (BAFinv), soil-to-plant (STP) factors, sediment-to-invertebrate/fish (STI/F), and reference toxicity values (RTVs) are used to obtain exposure estimates and calculate potential risks to ecological receptors. The values used in the BERA were obtained from the literature; however, the literature citations were not provided for all values in the BERA text and tables. For this review, currently accepted values provided in the literature were reviewed and used to update the values used in the BERA.

Very few STP, BAFinv, and STI/F factors were used in the BERA, which led to an assumption that 100% of most COPCs in soil or sediment were absorbed by biota growing or living in contaminated media. Updated STP factors are provided by the Bechtel Jacobs Company (1998a) for inorganic chemicals and by RAIS for organic chemicals. Empirically-derived BAFinv factors were taken from the published literature when possible (Sample et al. 1998; Braunschweiler 1996). In the absence of empirically derived values for organic chemicals, BAFinv factors can be calculated using methods described by Menzie et al (1992). STI/F factors have been published by Bechtel Jacobs Company (1998b) and EPA (1998). Table B-5 presents new STP, BAFinv, and STI/F factors for all COPCs. Chemical-specific factors used in the CSSS BERA are shown in parenthesis, when available. Updated chemical-specific factors that are less than one will lead to a reduction in risk while factors that are greater than one will lead to an increase in risk. As can be seen in Table B-5, updated chemical-specific factors generally lead to increased uptake for SVOCs, PCBs, and mercury.

The majority of RTVs used in the BERA were obtained from EPA's Integrated Risk Information System although some RTVs were obtained from published literature. An initial comparison of RTVs from Table 7-5 of the BERA with the RTVs listed in Appendix H of the report revealed discrepancies between RTVs for thallium for the American robin and all COPCs for the Great Blue Heron, except copper and nickel. In the BERA, some RTVs for a specific chemical were used for all receptors due to lack of species-specific toxicity data. This is an acceptable practice; however, allometric scaling should be used to account for differences in body weight to tailor the toxicity data to different species. Due to a lack of species-specific RTVs, all RTVs should be updated using values provided in Sample et al. (1996) and EPA (1999b) and allometry should be used to scale values from test species to the species of concern. The majority of the current RTVs are at least an order of magnitude lower than those used in the BERA. This decrease in RTVs indicates that the COPCs are more toxic to the receptor and will result in the calculation of greater HQs than those in the BERA.

Because of the large number of changes identified in the various exposure factors (STPs, BAFinv, and STI/F) and in the RTVs themselves virtually all of the Hazard Quotients estimated in the BERA are likely to have changed. In addition a number of new COPCs have been identified. Since the HQ calculation involves all of these factors, it is difficult to tell which HQs will increase and which decrease without redoing all of the calculations.

In the original BERA most of the HQs for the American robin, the great blue heron, and the Indiana bat exceeded 1. Some were as high as 30,000 to 40,000, however no RAOs were established to address these estimated risks. In fact the only RAO established for which ecological risks were a consideration was that for PCBs. The RAO of 1.0 mg/kg, which was initially established for PCBs in sediment, was based on human health considerations, however the TEC-1 of 1.03 mg/kg for mink was also considered. It is not clear from the ROD why RAOs were not established to mitigate other estimated ecological risks. However since HQs for ecological receptors substantially greater than 1 were estimated in the BERA but not addressed in the ROD, it would not appear useful to recalculate all exposure estimates and HQs for the American robin, Indiana bat, and great blue.

The only ecological risks considered in establishing RAOs were those to the mink. The mink was also the only receptor for which some risks estimated in the BERA were below the benchmark level of one. Since risks to the mink were considered in establishing RAOs for the site and these risks might increase as a result of the updated exposure factors and RTVs, HQs for the mink were recalculated for exposure to selected indicator chemicals from each chemical class. Table B-6 provides the list of COPCs used to update risk estimates and their respective RTVs for the mink. The calculations were performed in the manner described in the BERA, although STI/F factors were used for all calculations. For comparison, risks also were recalculated for exposure of the other ecological receptors to selected COPCs. The RTVs used in updating the calculations for the American robin, great blue heron, and

Indiana bat also are provided in Table B-6. The following equation demonstrates the use of the updated chemical-specific factors for all COPCs:

$$Dose = \frac{SFF \times [(IR_{soil/sed} \times C_{soil/sed}) + (IR_{plant} \times C_{soil} \times STP) + (IR_{inv/fish} \times C_{soil/sed} \times STI/F)] \times ED}{BW}$$

Where:

Dose = mg COPC per kilogram body weight per day (mg/kg BW-day)  
 SFF = Site foraging frequency (unitless)  
 IR<sub>x</sub> = Ingestion rate of media/food (mg/kg)  
 C<sub>soil/sed</sub> = Concentration of COPC in soil or sediment (mg/kg)  
 STP = Soil to plant transfer factor, used only for those receptors consuming plants (unitless)  
 STI/F = Soil to invertebrate or fish transfer factor, used only for those consuming invertebrates or fish (unitless)  
 ED = Exposure duration  
 BW = Body weight

Updated exposure and risk calculations for the mink and other ecological receptors are provided in Table B-7. The site-specific PCB STI/F factor of 5.058 was used in the updated calculations while updated STP factors, BAF<sub>inv</sub>, and STI/F factors were used for all other calculations. For the mink, updated chemical-specific factors and RTVs led to increases in estimated doses and risks for exposure to COPCs, except Aroclor-1016, in Wildcat and Kokomo Creek sediment. Previous calculations indicated a potential for adverse effects in mink with exposure to PCBs and zinc in sediment only, while the updated calculations reveal a high potential for adverse effects (HQ > 100) with exposure to PCBs, zinc, antimony, and benzo(a)pyrene in creek sediment. Updated risk calculations for the American robin, great blue heron, and Indiana bat are provided in Table B-7 for informational purposes and further reinforce the potential for adverse impacts on ecological receptors.

Threshold effect concentrations equivalent to a HQ of one (TEC-1) for exposure of the mink and Indiana bat to total PCBs were calculated in the BERA to guide cleanup in Wildcat and Kokomo Creek sediment. TEC-1 values were not calculated for other ecological receptors. The TEC-1 value was obtained by back-calculation, using the exposure estimation equation and RTV. The TEC-1 of 1.03 mg/kg for total PCBs for the mink was the most conservative value. However, the final remediation goal selected for total PCBs in creek sediment was 1.00 mg/kg and was based on protection of human health and that value was later increased to 5 mg/kg. For this review, the final remediation goal for total PCBs was input into the exposure estimation equation using updated chemical-specific factors and RTVs to obtain updated HQs for individual Aroclors, shown in Table B-8. The resulting HQ for Aroclor-1248 (the mixture with the greatest associated risk) was 115, assuming a media concentration of 5 mg/kg. The updated HQ range for other PCB mixtures was 1.3 (Aroclor-1016) to 25.5 (Aroclor-1242). Only risk associated with exposure to Aroclor-1016 was near the benchmark level of 1 (HQ = 1.3). Revision of the remediation goal for total PCBs would be necessary to achieve a risk level below the benchmark of 1 for the mink. TEC-1 values were recalculated to determine new remediation goals for exposure of mink to individual Aroclors. The following equation was used to calculate the updated TEC-1 values:

$$TEC-1 = \frac{C_{soil/sed} \times Target\ HQ}{Actual\ HQ}$$

Where:

TEC-1 = Threshold effect concentration for a hazard quotient of 1  
 C<sub>soil/sed</sub> = Concentration of COPC in soil or sediment  
 Target HQ = Target hazard quotient is 1  
 Actual HQ = Hazard quotient calculated in the BERA for a specific receptor exposure to a COPC

Calculation of TEC-1 values for PCB mixtures using updated inputs yielded values ranging from 0.043 mg/kg (Aroclor-1248) to 3.9 mg/kg (Aroclor-1016), shown in Table B-8. The TEC-1 value of 1.03 mg/kg and final remediation goal of 1.00 mg/kg for total PCBs fall within this updated range of TEC-1 values. However, the final

remediation goal of 1.00 mg/kg for total PCBs was subsequently revised to 5.00 mg/kg, which is outside the updated range of TEC-1 values and is less protective than the previous remediation goal.

#### **B.4. BERA Review Summary**

A 5-year review was conducted for the CSSS BERA. Based on a review of updated ecological screening benchmarks, new COPCs were identified for each exposure area. In addition, chemicals with a log  $K_{ow}$  greater than 3.5 were included as COPCs due to their potential to bioaccumulate. Chemical-specific exposure factors and toxicity values also were updated during the review process. All values have been updated since the BERA was conducted, and the revised values contribute to both increases and decreases in estimated risks to ecological receptors. All HQs for the American robin, great blue heron, and Indiana bat calculated in the original BERA were greater than the benchmark level of one, however these estimated risks were not addressed in the ROD. Risks to the mink were considered in the ROD. HQs for exposure of the mink to SVOCs, metals, and vinyl chloride were below the benchmark level and could increase as a result of updated exposure factors and RTVs; therefore, risks to the mink were recalculated for select COPCs. Significantly increased risk estimates for exposure of the mink to benzo(a)pyrene, antimony, zinc, and PCBs resulted from the updated calculations.

Remediation goals for the site were based mainly on the results of the BHHRA and background concentrations. Since HQs for ecological receptors substantially greater than 1 were estimated in the BERA but not addressed in the ROD, it did not appear useful to recalculate all exposure estimates and HQs for the American robin, Indiana bat, and great blue heron. However, a simple comparison of final remediation goals with ecological screening benchmarks for surface soil indicated that final remediation goals for the Markland Avenue Quarry, Acid Lagoon area, and Slag Processing Area were below the benchmarks except for lead in the Acid Lagoon area (remediation goal of 1,096 mg/kg vs screening level of 500 mg/kg). All final remediation goals for the Main Plant exceeded ecological screening benchmarks. Comparison of final remediation goals for sediment to ecological screening benchmarks indicated that remediation goals are not protective of ecological receptors. New TEC-1 values were calculated for several commercial PCB mixtures (Aroclors) based on updated chemical-specific factors and toxicity values to further assess the protectiveness of the final remediation goal for total PCBs. The previously calculated TEC-1 value of 1.03 mg/kg and final remediation goal of 1.00 mg/kg fall within the updated TEC-1 value range of 0.043 to 3.9 mg/kg for select Aroclors; although the updated remediation goal of 5.00 mg/kg does not fall within this range. The latest remediation goal of 5.00 mg/kg is not protective of ecological receptors.

## References

- Bechtel Jacobs Company LLC, 1998a, *Empirical Models for the Uptake of Inorganic Chemicals From Soil By Plants*, Prepared for the U.S. Department of Energy, Office of Environmental Management, Oak Ridge National Laboratory.
- \_\_\_\_\_, 1998b, *Biota Sediment Accumulation Factors For Invertebrates: Review and Recommendations for the Oak Ridge Reservation*, Prepared for the U.S. Department of Energy, Office of Environmental Management, Oak Ridge National Laboratory.
- Braunschweiler H, 1996, *Seasonal Variation in the Content of Metals in the Earthworm Dendrobaena octaedra (Sav.) in Finnish Soils*, Acta Zool. Fenn. 196:314-317.
- Buchman MF, 1999, *National Oceanic and Atmospheric Association (NOAA) Screening Quick Reference Tables*, NOAA HAZMAT Report 99-1, Seattle, Washington, Coastal Protection and Restoration Division.
- British Columbia Ministry of the Environment – Canada (BCMOE), 1995, *Criteria for Managing Contaminated Sites in British Columbia*, Waste Management Program, Victoria, British Columbia, Canada.
- BCMOE, 1989, *Criteria for Managing Contaminated Sites in British Columbia*, Waste Management Program, Victoria, British Columbia, Canada.
- Efroymson RA, ME Will, GW Suter II, and AC Wooten, 1997a, *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision*, Oak Ridge National Laboratory, Oak Ridge TN, ES/ER/TM-85/R3.
- Efroymson RA, ME Will, and GW Suter II, 1997b, *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes: 1997 Revision*, Oak Ridge National Laboratory, Oak Ridge TN, ES/ER/TM-126/R2.
- Friday GP, 1998, *Ecological Screening Values for Surface Water, Sediment, and Soil*, Westinghouse Savannah River Company, Savannah River Technology Center, WSRC-TR-98-00110, Aiken, SC.
- Indiana Department of Environmental Management (IDEM), 2002, *Indiana Environmental Rules: Water, 2002 Edition*, Updated through the December 1, 2002 *Indiana Register*.
- Indiana Department of Environmental Management (IDEM), 2001, *Criteria and Values for Selected Substances Calculated Using the Great Lakes Basin Methodologies*, ambient water quality standards available on-line at [www.in.gov/idem/water/planbr/wqs/criteria.html](http://www.in.gov/idem/water/planbr/wqs/criteria.html), last updated October 1, 2001, Office of Water Quality, Indianapolis, Indiana.
- Jones DS, GW Suter II, and RN Hull, 1997, *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision*, Oak Ridge National Laboratory, Oak Ridge TN, ES/ER/TM-95/R4.
- Menzie C, D Burmaster, J Freshman, and C Callahan, 1992, *Assessment of Methods for Estimating Ecological Risk in the Terrestrial Component: A Case Study at the Baird & McGuire Superfund Site in Holbrook, Massachusetts*, Environmental Toxicology & Chemistry, 2:245-260.
- National Oceanic and Atmospheric Association (NOAA), 1994, *NOAA Quick Reference Cards*, Buchman, HAZMAT Report 94-8.
- New York Department of Environmental Conservation (NYDEC), 1993, *Technical Guidance for Screening Contaminated Sediment*, NYDEC Divisions of Fish and Wildlife and Marine Resources.

Ontario Ministry of the Environment – Canada, 1993, by Persaud, Jaagumagi, and Hayton, *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*, Ottawa, Ontario, Canada.

Oak Ridge National Laboratory, 2002, Risk Assessment Information System (RAIS), website with risk assessment tools and information including chemical-specific factors and ecological benchmarks, [http://risk.lsd.ornl.gov/rap\\_hp.shtml](http://risk.lsd.ornl.gov/rap_hp.shtml)

Sample BE, JJ Beauchamp, RA Efroymsen, GW Suter II, TL Ashwood, 1998, *Development and Validation of Bioaccumulation Models for Earthworms*, Oak Ridge National Laboratory, Oak Ridge TN, ES/ER/TM-220.

Sample BE, DM Opresko, and GW Suter II, 1996, *Toxicological Benchmarks for Wildlife: 1996 Revision*, Risk Assessment Program, Health Sciences Research Division, Oak Ridge National Laboratory, ES/ER/TM-86?R3.

Suter GW II, and CL Tsao, 1996, *Toxicological Benchmarks for Screening of Potential Contaminants of Concern for Effects on Aquatic Biota on Oak Ridge Reservation: 1996 Revision*, Oak Ridge National Laboratory, Oak Ridge TN, ES/ER/TM-96/R2.

Suter GW II, MA Futrell, and GA Kerchner, 1992, *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota*, Environmental Sciences Division, Oak Ridge National Laboratory, ORNL/ER-139.

United States Environmental Protection Agency (EPA), 2002a, *Risk-Based Concentration Table*, 4/2/02, table available on-line at <http://www.epa.gov/reg3hwmd/risk/index.htm>, U. S. EPA Region III, Philadelphia, Pennsylvania.

\_\_\_\_\_, 2002b, Integrated Risk Information System (IRIS), on-line database available at <http://www.epw.gov/iris/>, entries as of Environmental Criteria and Assessment Office, Cincinnati, Ohio (entries on-line as of May 2002).

\_\_\_\_\_, 2002c, *Table 3. Region 4 Waste Management Division Sediment Screening Values for Hazardous Waste Sites*, available at <http://www.epa.gov/region4/waste/ots/ecolbul.htm> (last updated June 4, 2002), EPA Region 4, Waste Management Division, Atlanta, Georgia.

\_\_\_\_\_, 2001a, Federal Register, 66, 6976-7066, January 23, 2001, National Primary Drinking Water Regulations; Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring, final rule.

\_\_\_\_\_, 2001, *ECO Update: The Role of Screening Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments*, Office of Solid Waste and Emergency Response, EPA-540-F-01-014.

\_\_\_\_\_, 2000, *Drinking Water Standard and Health Advisories*, EPA 822-B-00-001, Summer 2000, Office of Water, Washington, D.C.

\_\_\_\_\_, 1999a, *National Recommended Water Quality Criteria – Correction*, Office of Water, EPA822-Z-99-001.

\_\_\_\_\_, 1999b, *Screening Level Ecological Risk Assessment for Hazardous Waste Combustion Facilities, Appendix E*, Office of Solid Waste and Emergency Management, EPA530-D-99-001A.

\_\_\_\_\_, 1998, *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Volume Two, Appendix A*, Office of Solid Waste and Emergency Response, EPA530-D-98-001B.

\_\_\_\_\_, 1997, *Exposure Factors Handbook*, EPA/600/P-95/002F, Office of Research and Development, Washington D.C.

\_\_\_\_\_, 1996, *Risk-Based Concentration Table –November 1996* (now obsolete), U. S. EPA Region III, Philadelphia, Pennsylvania.

\_\_\_\_\_, 1994, *Soil Screening Guidance*, Office of Solid Waste and Emergency Response, Washington D.C.

USEPA, 1993, *Sediment Quality Criteria for the Protection of Benthic Organisms: Acenaphthene, Dieldrin, Endrin, Fluoranthene, and Phenanthrene*.

\_\_\_\_\_, 1992a, *Dermal Exposure Assessment: Principles and Applications*, EPA/600/8-91/011B, Office of Research and Development, Washington, D.C.

USEPA, 1992b, *Summary Quality Criteria for Water*, Office of Science and Technology.

Will ME and CE Suter, 1995, *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants*, Prepared by Environmental Sciences Division, Oak Ridge National Laboratory



<b>Table B-5</b> <b>Chemical-Specific Factors for COPCs</b> <b>Continental Steel Superfund Site</b> <b>Kokomo, IN</b>			
<b>Chemical</b>	<b>STPs<sup>(a)</sup></b>	<b>BAFinv<sup>(b)</sup></b>	<b>STL/F<sup>(c)</sup></b>
Acenaphthene	0.12	30.3	607
Acenaphthylene	0.17	30.3	NA
Anthracene	0.11	30.3	2,600
Benzo(a)anthracene	0.019	30.3	5,100
Benzo(a)pyrene	0.011	30.3	9,950
Benzo(b)fluoranthene	0.011	30.3	9,950
Benzo(b,k)fluoranthene	NA	30.3	9,950
Benzo(k)fluoranthene	0.0043	30.3	9,950
Benzo(g,h,i)perylene	0.0056	30.3	NA
Bis(2-ethylhexyl)phthalate	0.055	30.3	360
Chrysene	0.019	30.3	6,030
Dibenzo(a,h)anthracene	0.0043	30.3	12,800
Fluoranthene	0.055	30.3	15,700
Fluorene	0.11	30.3	1,200
Indeno(1,2,3-cd)pyrene	0.0056	30.3	13,100
Pentachlorophenol	0.014	30.3	397
Phenanthrene	0.082	30.3	3,300
Pyrene	0.055	30.3	11,900
Acetone	52	30.3	0.4
1,1-Dichloroethene	3.4	30.3	24.1
Methylene chloride	6.7	30.3	5.3
2-Methylnaphthalene	0.21	30.3	NA
Trichloroethene	1.5	30.3	41.6
Toluene	1.0	30.3	62.7
Vinyl chloride	1.0	30.3	4.37
Xylenes	1.0	30.3	160
Aroclors	0.013 (0.02)	30.3 (3.0)	9.016 (5.058)
Antimony	0.005	0.523	40
Arsenic	0.0371	0.523	0.329
Barium	0.1	1.0	NA
Beryllium	0.01	1.0	42
Cadmium	0.517 (0.55)	40.7 (4.6)	2.822
Chromium	0.04	3.1b	0.179
Cobalt	0.054	1.0	NA
Copper	0.123	1.53	2.424
Lead	0.0377	1.52	0.276
Manganese	0.68	0.29	NA
Mercury	1.0	20.6	1.422 (1)
Nickel	0.0342	4.73	0.857
Thallium	0.004	1.0	1,400
Zinc	0.358	12.9	3.092

Notes:

Numbers in parenthesis were values used in CSSS ERA.

Values greter than 1 will lead to increased risk estimates and are printed in bold type.

(a) = STP factors from Bechtel Jacobs Company (1998a) and RAIS (2002).

(b) = BAF<sub>inv</sub> factors for inorganic COPCs from Sample et al. 1998 and Braunschweiler 1996;

BAF<sub>inv</sub> factors for organic COPC values were calculated using Menzie et al. (1992) methods.

Assumes lipid content of earthworm is 2%,  $f_{oc}$  is 0.01.

(c) = STVF factors for inorganic COPCs and PCBs from Bechtel Jacobs Company (1998b); all other STVF from EPA (1998).

NA = Not available.

Table A-3			
Chemicals Detected in Surface Soil (Non-Residential) - Main Plant, Acid Lagoon area			
Chemicals Detected	New and/or Lower Screening Value?	COPC added?	Comment
<b>Inorganics</b>			
Aluminum	no	no	
Antimony	no	no	
Arsenic	no	no	
Barium	no	no	
Beryllium	no	no	
Cadmium	no	no	
Calcium	no	no	
Chromium (as Cr VI)	YES	no	Already a COPC, Acid Lagoon area
Cobalt	YES	no	Max < current screening value
Copper	no	no	
Cyanide	no	no	
Iron	no	no	
Lead	no	no	
Magnesium	no	no	
Manganese	no	no	
Mercury	no	no	
Nickel	no	no	
Potassium	no	no	
Selenium	no	no	
Silver	no	no	
Sodium	no	no	
Thallium	YES	no	Max < current screening value
Vanadium	no	no	
Zinc	no	no	
<b>Pesticides/PCBs</b>			
4,4'-DDD	no	no	
4,4'-DDE	no	no	
4,4'-DDT	no	no	
Aldrin	no	no	
alpha-BHC	no	no	
alpha-Chlordane	no	no	
delta-BHC	no	no	
Dieldrin	no	no	
Endosulfan I	no	no	
Endosulfan II	no	no	
Endosulfan Sulfate	no	no	
Endrin	no	no	
Endrin aldehyde	no	no	
Endrin ketone	no	no	
gamma-BHC	no	no	

gamma-Chlordane	no	no	
Heptachlor	no	no	
Heptachlor epoxide	no	no	
Methoxychlor	no	no	
Aroclor 1242	YES	no	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1248	YES	no	Already a COPC, Main Plant, Acid Lagoon area
Aroclor 1254	YES	YES	Acid Lagoon area, Max > current screening value
Aroclor 1260	YES	no	Already a COPC, Main Plant
<b>Semivolatiles</b>			
1,2,4-Trichlorobenzene	no	no	
Phenol	no	no	
Pentachlorophenol	no	no	
Carbazole	no	no	
Bis(2-ethylhexyl)phthalate	no	no	
Di-n-butylphthalate	no	no	
Di-n-octylphthalate	no	no	
Dibenzofuran	no	no	
2-Methylnaphthalene	YES	no	Max < current screening value
Acenaphthene	no	no	
Acenaphthylene	no	no	
Anthracene	no	no	
Benzo[a]anthracene	no	no	
Benzo[a]pyrene	no	no	
Benzo[b]fluoranthene	no	no	
Benzo[b&k]fluoranthene	no	no	
Benzo[g,h,i]perylene	no	no	
Benzo[k]fluoranthene	no	no	
Chrysene	no	no	
Dibenz[a,h]anthracene	no	no	
Fluoranthene	no	no	
Fluorene	no	no	
Indeno[1,2,3-cd]pyrene	no	no	
Naphthalene	YES	no	Max < current screening value
Phenanthrene	no	no	
Pyrene	no	no	
<b>Volatiles</b>			
1,1,2-Trichloroethane	no	no	
1,1-Dichloroethane	no	no	
1,1-Dichloroethene	no	no	
1,2-Dichloroethane	no	no	
1,2-Dichloroethene (total)	no	no	
2-Butanone	no	no	
2- Hexanone	YES	no	Max < current screening value
4-Methyl-2-pentanone	no	no	
Acetone	no	no	
Benzene	YES	no	Max < current screening value
Carbon disulfide	no	no	
Chlorobenzene	YES	no	Max < current screening value

Chloroethane	YES	no	Max < current screening value
Chloroform	no	no	
cis-1,3-Dichloropropene	no	no	
Ethylbenzene	no	no	
m,p-Xylenes	no	no	
Methylene chloride	no	no	
o-Xylene	no	no	
Styrene	No	no	
Tetrachloroethene	No	no	
Toluene	No	no	
Xylenes (total)	No	no	
Trichloroethene	YES	YES	Main Plant, Acid Lagoon area, Max > current screening value
Vinyl chloride	No	no	

Screening value = 0.1 x RBC for Residential Soil from EPA Region III (EPA 2002).

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**ATTACHMENT 5**  
**Interview Report**

## ATTACHMENT 5 - Report of Community Interviews

### Persons interviewed:

- 6 - Private individuals
- 1 - City/ County elected officials
- 8 - City/County agency, department or organization representatives
- 1 - Nearby business representatives
- 3 - Environmental group representatives
- 1 - Local Labor representatives
  
- 15 Homeowners
- 1 Tenants
- 4 Not residents of the Kokomo area

Number in household ranged from one (1) to four (4) persons.

Time of residence ranged from zero (0) to sixty-three (63) years, with an average of twenty-six (26) years.

### How do you feel about the rate of the investigation and cleanup?

- 9 Good or okay
- 7 Slow
- 1 Other (See "Summary of Other Issues and Comments")

### What do you think might be the reason(s) for the time involved?

- 11 - Funds
- 4 - Bureaucracy
- 8 - Logistics
- 1 - Other (See last question: "Do you have any other comments or concerns?")

### Have information updates been frequent enough?

- 15 - Yes
- 2 - No

### How would you suggest that we improve communication?

Suggestions included increased mailings, meetings, email reports, and media use; and making the IDEM web site more user-friendly.

### Do you feel that news media is reliable?

- 8 - Yes
- 7 - No
- 3 - Sometimes

### What do you think is the best way to reach you with factual information?

- 10 - Fact Sheets /mailings
- 3 - Email
- 1 - Radio

- 3 - Newspaper  
1 - Meetings  
1 - Individual interviews

Please choose your top 4 sources of information, and rank them 1-4.

**Table 2 - Community Interview Information Source Results**

Information Source	0	1	2	3	4	Total
<i>Fact sheets (from IDEM or EPA)***</i>		4	1	2	10	17
<i>Public meetings***</i>		2	9	5		16
<i>Newspaper***</i>		8	2	3	1	14
<i>City/County Officials***</i>		1	4	3		8
IDEM internet web site			1	3	3	7
Radio		1		2	3	6
Other **			4	1	1	6
Television		1	1			2
Neighborhood associations				1		1
Information repository (library)					1	1
Labor organization					1	1
Community/church organizations			1			1
City or County internet web sites	0					0
Civic/community meetings	0					0
Other elected representatives	0					0

\* Some respondents selected less than four information sources.

\*\* Responses included former employees, IDEM project manager, onsite individuals, and Wildcat Guardians.

\*\*\* Top four selections.

Previously, community members were concerned about impacts to Kokomo and Wildcat Creeks and area groundwater from Continental Steel and other sources. Do you feel these are still potential problems?

- 16 - Yes  
2 - No  
2 - Unsure

How would you rate your understanding of the Superfund process? ( 1 = very good, 2 = medium, 3 = poor)

- 2 - Very good  
13 - Medium  
5 - Poor

Do you think that community understanding and concern about the site is strong enough to impact the quality of the investigation and cleanup?

- 9 - Yes  
7 - No



1 - Some

**Are you concerned about the cost of the cleanup to taxpayers? Do you have any suggestions?**

15 - Yes

3 - No

Suggestions included: spend more money on enforcement/prevention; science is too detailed; some costs are exotic; scrutinize actions and costs; and Superfund funding should be reauthorized.

**Do you feel that the site poses risks now to members of the community?**

7 - Yes

8 - No. (Most of these noted that removal of the buildings eliminated the risks.)

3 - Unsure

**Who do you think should own/control the site?**

9 - Government

1 - Private developer

3 - Either private or government

2 - Other (See Full Statement of Phil Kauble below)

**Have your property values been affected by the site or by the cleanup so far?**

1 - Yes

8 - No

2 - Not applicable, person does not live in the Kokomo area.

1 - Other (Stated that property value increased when the steel mill closed.)

**Did your property undergo soil removal and restoration?**

1 - Yes

15 - No

**What would you like to see the site used for in the future?**

6 - Park

6 - Mixed recreational and industrial/commercial uses

2 - Industrial

1 - Compost operation

3 - Commercial

2 - Stormwater storage

1 - Environmental education center

**Are you aware of or participating in the re-use study that the City is working on?**

2 - Yes

9 - No

3 - Aware but not participating

3 - Aware and participating

If you have a question or problem with the site, do you know whom to contact?

19 - Yes

3 - No

Do you have any other comments or concerns?

Concern	Response
Concerned that background is affected by other sources of contamination.	Background is affected by other sources, however, CERCLA will only address contamination attributable to the site being addressed.
Concerned about whether the walls in the center of the site and at the east perimeter of the site will remain.	The center wall will be removed as part of the final remedial action. The east wall was left as requested by residents at the time. It may be removed by a future property owner.
Concerned about other PCB-contaminated areas (Kitty Run Drain, "The Farm" and another former quarry site near the intersection of Washington Street and Park Avenue).	These sites have been referred to IDEM and EPA for further investigation.
Concerned about the length of time for the creek to recover from cleanup work, and effects on trees and the flow of water in the stream. Concerned about the details of the plan to reroute water through pipes during the creek dredging. Concerned about the condition of the creeks after the cleanup, and the decision process with regard to PCB cleanup goals. The habitat of the creek is important to support the ecosystem.	It may take the creeks 1-2 years to recover from cleanup work, however, the cleanup will provide a much healthier environment for biota. We have shared restoration plans with the community and they were favorably received. Specific design plans will address concerns about effects on trees and water flow, and provide details on rerouting of water. The planned ROD Amendment will provide information regarding the decision process with regard to cleanup goals.
Concerned about possible future monitoring of the CAMU.	IDEM will be responsible for future monitoring.
Local government should not sustain any liability.	Liability protection from past environmental damage is provided to local government by State law. EPA and IDEM are working with local government to resolve Superfund liability issues.
Concerned about the status and time frame for cleanup of the stone quarry, and whether wells will need to be placed on their property. Contaminated water migrates to the basement of the neighboring buildings. Wants list of groundwater contaminants. Concerned about control of wildlife during quarry work.	The remedial action may be completed by 2009 if adequate funds are available. No more wells are expected to be needed on the property in question. A list of groundwater contaminants was provided. Wildlife may be controlled using an approach similar to that used during the Main Plant building demolition.
Want soil removal done by local organized labor, and a Project Labor Agreement for future work on this project.	Such an agreement may be used to the extent allowed by the law. Every effort will be made to work with local labor organizations.
Concerned about sediment drainage during the cleanup of the creeks and long term use of the site.	An Erosion Control Plan will be provided that addresses such sediment drainage.
Concerned about safety of yard that is near the	Some additional soil sampling for PAHs is

site but was not tested.	recommended by this report. The extent of lead contamination was identified and address during the Residential Soil Removal Action.
IDEM and onsite personnel were helpful in completion of new soccer field project.	Thank you for your comment.
Former employees lost jobs and pensions when the plant closed, therefore, a private individual should not profit from the land. Former employees should be given free and clear title to the property. (See full statement of Phil Kauble below.)	This issue should be addressed by local planning concerns.
The cleanup is a farce, the system is irresponsible, IDEM is not doing a responsible job of cleanup and very little has been done to control the problem.	IDEM and EPA have performed extensive work and removed great volumes of contaminants from the site, and will continue efforts to complete the cleanup.
Concerned about what was in the air, water and ground of the immediate neighborhood before the closure.	IDEM and EPA have investigated the site and information regarding contaminants currently in air, water and ground is available at the Public Information Repository. Additional information collection during the plant's operation is available at the IDEM Central File Room, 12 <sup>th</sup> Floor, Indiana Government Center North, Indianapolis, IN. The file room is open to the public from 8:15 a.m. until 4:45 p.m., Monday through Friday.
On-site containment and construction of a CAMU are not protective in the long term, off-site disposal should be considered.	Off-site disposal was considered during the Feasibility Study but was not chosen because on-site disposal provided equivalent protection at a significantly lower cost. As requested, an updated estimated for off-site disposal was developed. Off-site disposal would cost an additional \$10 - 12 million.

**FULL STATEMENT OF PHIL KAUBLE (This written statement was submitted during the interview.)**

When addressing the future use, control and ownership of the Continental Steel Superfund site, the voice of the former workers should be given high priority for the following reasons.

Because Penn-Dixie Industries, Inc., intended to loot the workers' pension fund and abandon Continental, the workers went on strike to resist the attack at the bargaining table. Being successful, the workers gained ironclad contract language guarantying the funding and ethical administration of their retirement program. Then, in 1974, Congress enacted the Employee Retirement Income Security Act (ERISA) to insure, amongst other things, that pension plan administrators operate a pension plan in accordance to the documents and instruments governing the plan they administer, without dual loyalties and for the sole purpose and benefit of the plan participants and beneficiaries in the highest standard of integrity, ethics and prudence under the strict rules governing fiduciaries. The Continental plan carried with it the full force and effect of ERISA after 1974.

Penn-Dixie filed for Chapter 11 bankruptcy in 1980. Because of the woefully under-funded position of all Penn-Dixie pension plans, including continental's, the pension benefit guaranty corporation, the federal pension watchdog, was a key player in the case and a major beneficiary of the 1980 settlement. Subsequently, PBGC took millions from the pot that was needed for continental's survival. Moreover, Continental became obligated to pay PBGC millions more between 1980 and its closing in 1986. Millions for pension liabilities on plans that were supposed to be fully funded by contract and law after 1971 and 1974, respectively. In all due respect, the Pension Benefit Guaranty Corporation became the same

parasitic bloodsucker on Continental's financial position and ability to survive as Penn-Dixie was before the 1980 bankruptcy. Obviously, Continental needed every dollar it could get its hand on to survive, and PBGC taking everything it could from Continental to satisfy debt that should not have been in the first place. Why Continental was allowed to violate the contract and law under-funding the pension plan to be in a position of owing PBGC anything remains a mystery. Obviously, someone in government did not do their job and allowed Continental to slip through the crack.

In 1982, and again in 1983, Continental asked the workers for concessions. The workers first refused to even listen to the demand in both cases. Before giving Continental anything the workers demanded to know the status of the pension plan. And, of course, they were given all kinds of assurances that they had the "Cadillac" of pension plans and that it was fully funded. However, as the entire world now knows, this was nothing but bald faced lies.

Only after being falsely assured and re-assured numerous times that their pension plan was in absolute perfect order did they agree to give Continental concessions, which amounted to over \$30 million by the time Continental closed in 1986. And, because of their cooperation, Continental gave their union a seat on its board of directors. And from this position, the union participated in decisions on continental's day to day business affairs and the administration of the pension plan without the workers' knowledge or consent.

In late September or early October 1985, Continental stopped paying the workers' insurance claims. However, the union did absolutely nothing at the time to remedy this breach of contract and violation of labor law.

On November 25, 1985, Continental filed Chapter 11, bankruptcy. And, although the bankruptcy rules provide the right to be heard, but not to appeal, to labor unions, the union filed a motion to intervene as a creditor. However, the union was not a creditor and never filed a proof of claim at any time to support its absurd motion.

The Chapter 11 was converted to a Chapter 7 on February 25, 1986. And at no time did the union move to intervene or bring forward its motion to participate in the Chapter 7 case as a creditor or anything else. However, the record is replete with pleadings asserting the union was the official agent of the now former employees. In sum, the union's Chapter 11 motion as a creditor, even if valid, was not as a labor union giving rise to any representation of union employees or other creditors. How the union used this motion as a creditor to purport to represent other creditors is another complete and utter mystery.

The United States Supreme Court ruled in 1971 that labor unions do not represent former employees and retirees. In other words, **the union had no business whatsoever in the Chapter 7 case of Continental Steel, but our government did absolutely nothing to stop this fiasco.**

The Pension Benefit Guaranty Corporation and the EPA/IDEM filed motions to intervene and were beneficiaries of the 1986 bankruptcy settlement to the tune of \$5 million. In sum, PBGC, EPA/IDEM claims competed against the former workers in the final divvy of Continental's assets. And, although legal, the issue of ethics and fairness are certainly in question in this instance. After all, PBGC had already taken a huge share of gold from the pot between 1980 and 1986, which helped insure Continental's demise. It did absolutely nothing between 1974 and 1986 to insure that Continental was operating the pension plan in compliance with the documents and instruments governing the plan as required by law that PBGC was duty bound to enforce at all times after the enactment of ERISA in 1974. In sum, the claim PBGC enforced in continental's bankruptcy was due to PBGC's negligence in the first place. PBGC was only worried about getting as much money as it could from Continental and didn't give a hoot about doing anything to help the workers. PBGC never once included the workers in anything.

And, Continental was in violation of environmental standards long before 1986, but had only \$150,000 in the closure trust fund for clean up. EPA/IDEM had plenty of time and notice of problems before Continental closed to raise the bar on Continental's obligation, but did nothing. If PBGC was taking as much money as it could from Continental, then why didn't EPA/IDEM do the same thing?

But, aside from all of this, there remains a much bigger and more important issue involved in the case. That is the issue of what the workers' now former union was doing in the Continental bankruptcy as an agreeing party to the \$5 million awarded to PBGC and EPA/IDEM, and the union being allowed to take \$559,000 from the workers' share of the divvy without ever filing proper motions to intervene or a proof of claim to participate in the case. The union was a director of the bankrupt entity who participated in decisions under-funding the pension plan and insurance agreement. It's ludicrous to think that a director of a bankrupt entity has the right to represent and settle claims of creditors against the bankrupt entity. In short, the union used the Continental bankruptcy to avoid liability against itself - plain and simple. Government oversight officials and authorities were crawling all over this case but paid no attention to this obvious scam and fraud.

Now, why did our government allow this scam and fraud to ripen? Were there quid-pro-quo agreements between the union, PBGC and EPA/IDEM? Did our government give comfort and aid to a corrupt, illegal enterprise? The answer, to the latter at least, is yes!

After Continental was extinguished by operation of law, the union was no longer a legal entity, with respect to Continental, entitled to represent anyone or anything in the Continental case. But our government did absolutely nothing to uphold the laws of the United States or its constitution. It did not challenge the union's phony motion to intervene as a creditor in the Chapter 11 case. It did not utter a word about the union's failure to intervene or bring forward its absurd motion in the Chapter 7. It did not utter a word about the 1971 U.S. Supreme Court ruling restricting union representation to "employees", not former employees and retirees; or the lack of a proof of claim or legitimate standing of the union as a creditor, a legal entity, a labor union, a director, or anything else.

Likewise, our government did absolutely nothing to investigate the union's involvement in the administration of the pension plan, breaches of fiduciary duties, or the unpaid insurance claims before Continental closed. Nor did it investigate complaints raised about that issue after Continental closed. In sum, our government was content to let the union do whatever it wanted just so long as the union agreed to share the bankruptcy divvy with PBGC and EPA/IDEM.

It would be an act of negligence and stupidity on my part if I did not raise issue with the sale of the Continental property for \$10 to a man with no visible resources to assume the tax and environmental liabilities; and the removal of hundreds of thousands of dollars worth of scrap from the site without a cent being paid on the liability.

The U.S. Department of Justice filed an objection to the sale because it obviously smelled a skunk in the woodpile. However, the objection was pulled and the DOJ just simply walked away. There was absolutely no follow-up or oversight of anything by the DOJ after that point forward. No one was monitoring the new owner's failure to meet his tax and environmental obligations, that were spelled out in the DOJ's objection, or the removal and sale of hundreds of thousands of dollars worth of scrap from the site without a cent going toward the outstanding liabilities that were clearly a part of the purchase package.

If it hadn't been for the dedicated vigilance of a number of former workers and the reporting and complaints to the proper officials of the scrap removal activity taking place 24 hours a day, \$10 million worth of scrap would have been removed and sold without a cent going toward the liability.

And to point out the dilemma of the former workers in this matter, they were interested in using the value of their bankruptcy claims to purchase the site in hopes of finding someone to re-open the facility. However, their efforts were trashed with threats from the court that they would be held in contempt, held to the highest order of scrutiny, and put in jail if they failed to meet the tax and environmental obligation that went along with the deal.

Why this same standard was not applied to the current owner is a complete and total mystery. In short, the ex-workers were told to keep their noses out of the Continental case or go to jail. Yet a man with no money and highly questionable motives simply went in and plunked \$10 on the table and walked away

with hundreds of thousand of dollars from the removal and sale of scrap.

The sale of Continental was not a private transaction. It was held in the public domain of a bankruptcy court where everything is supposed to be out in the open for all to see, and it was finalized by an order of the court. As such, the sale remains a matter of public concern and open to scrutiny. Thus, the public has every right to know how a man with no money walked into the U.S. Bankruptcy Court, with a team of lawyers, accountants and business advisors in tow, plopped down \$10, and then removed and sold hundreds of thousands of dollars worth of scrap from the site and never paid a dime of the obligation he incurred in the public sale of the property.

At the very least, the current owner is in violation of the court order and should be held in contempt. Moreover, being in contempt would be the window of opportunity for authorities to investigate the current owner, his motives, whether he acted alone or in concert with others, whether it involves political figures from the community, etc., etc.

To be sure, the Continental case is overflowing with abuses of power and authority, negligence, and pure stupidity from beginning to end by oversight officials and authorities who simply did not do their jobs to uphold the laws of the United States or its Constitution. The Continental workers were entitled to investigations they never got. And they were deprived of their Constitutional right to be represented by a lawyer in a court of law.

Instead, they were purportedly represented by a corrupt, illegal enterprise posing as a legal labor union, a director of the bankrupt entity no less, that was protecting and representing its own self-serving interest in the face of potential lawsuits for breaches of fiduciary duties, etc. The workers were lied to repeatedly both before and after Continental closed. They were duped into giving Continental over \$30 million on the lies that their pension plan was fully funded when in fact it was in shambles. Had the workers known what PBGC was doing and the extent of plan under-funding, they would never have given Continental a dime. In fact, they could have demanded at the bargaining table that the \$30 million been put into the pension plan.

Or they could have forced the liquidation of Continental at that time when there were still assets available to cover the pension liability had the workers been given all the facts to make an informed decision about giving Continental concessions. In short, the workers paid through the nose for the continuation of operations of Continental from 1982/1983 to 1986 through the depletion of assets available to pay their pensions. The workers never had the chance to make the right call because of all the lies they were told throughout.

And regardless of what some might argue about the workers' strength, importance to Continental's survival and continuation of operations, the workers could have thrown a big monkey-wrench into the gears at any time because of the breach of the pension agreement, had they known the truth, which is the reason for all the lies. In fact, when they were finally told in December 1986 that their pension plan was in shambles, the workers were steadfast in telling Continental, the bankruptcy court and the union to "shut the damn place down" because they were done giving and fed up with all the lies.

And in the final wrap-up of the Continental bankruptcy, apparently due to a miscalculation by the trustee and his lawyers and accountants, there was almost a half-million dollars left after everyone had been paid. The trustee and his attorneys laid claim to the money because no one else came forward to stake a claim for a share. Why didn't PBGC or EPA/IDEM go after that money? By the settlement agreement the trustee and his attorneys were paid every dime they were entitled to receive yet they got another half-million dollars because no one else came forth to stake a claim for it. This is sickening and repulsive. PBGC and EPA/IDEM had no problem taking money away from the former workers in the bankruptcy case yet did absolutely nothing to stake a claim for what was left over and belonged to no one. Why?

And it was all done with the full cooperation and purported oversight of government officials and authorities that were not doing their jobs. Now, a number of people would like to say that whatever the union did was not their concern or responsibility, but that does not apply to a legal proceeding in a court

of law. Lawyers are obligated by the code of professional conduct and rules of jurisprudence to police themselves and other lawyers. So, whatever the union did was because other lawyers, and government officials and authorities let the union get by with it.

Thus, it's long past time that the former Continental workers receive at least part of their due. If the property is going to be given away free to anyone, then it should be given to the former workers. If the property was sold for \$10 to the current owner so he could make hundreds of thousands of dollars removing and selling off scrap, then the workers should have been allowed to bid \$20 and reap the benefit without liability like the current owner did.

At the very least, the Continental workers, and taxpayers, are entitled to full accounting and disclosure before the property is given to anyone. They are entitled to know whether the current owner acted alone or in concert with others, whether political figures were involved, how much scrap he removed and sold, how much money he made and where this money went. And, why Continental was allowed to under-fund the pension plan in violation of the controlling documents and instruments governing the plan, and the law. Why their local union president was given a pension while still working and drawing a paycheck, yet their applications for retirement were ignored. What their union did to permit or encourage Continental to under-fund the pension plan and insurance agreement. How the ex-workers were legally represented in the bankruptcy case by a defunct union, a now former director of Continental, and how and why the union was granted \$559,000 from the estate to settle claims the union participated in and did absolutely nothing about while Continental was still living.

And why none of the above was investigated by the appropriate authorities and officials, and why our government gave comfort and aid to an illegal, corrupt enterprise to defeat the laws of the United States and its Constitution.

Prepared by Phil Kauble  
1024 South McCann Street  
Kokomo, Indiana 46902

CC U.S. Senator Richard G. Lugar  
U.S. Senator Evan Bayh  
Mayor Jim Trobaugh  
Howard County Commissioners  
Kokomo Perspective  
Kokomo Tribune

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**ATTACHMENT 6**  
**Photos Documenting Site Conditions**

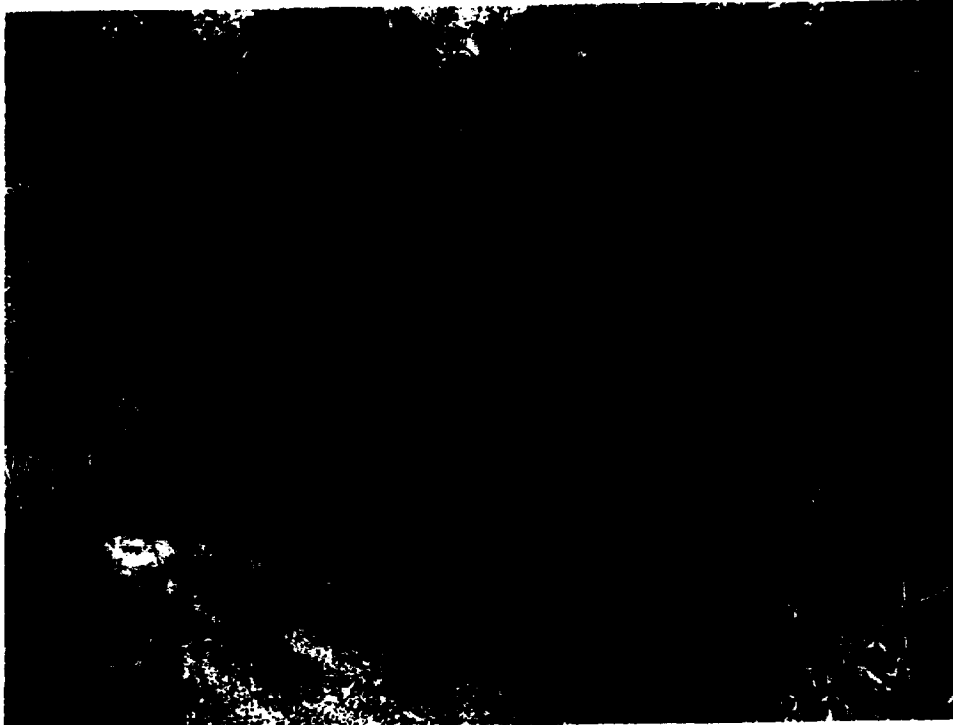






Markland Quarry - abandoned tanks and unvegetated area on landfilled portion.





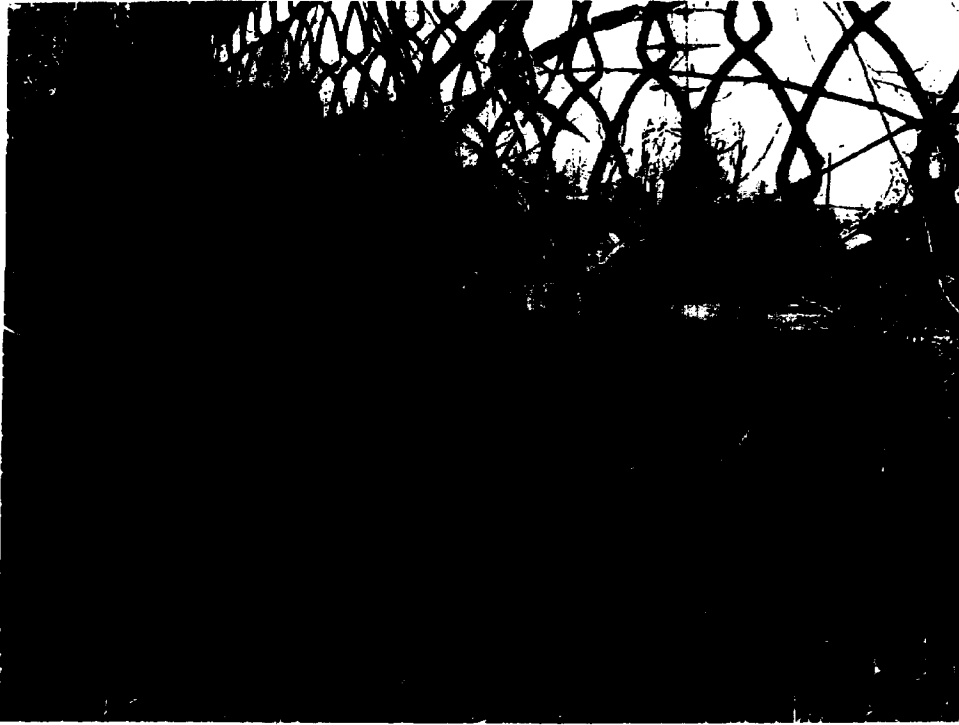
Markland Quarry - drums scattered on landfilled portion.  
Quarry pond, view toward landfilled portion.





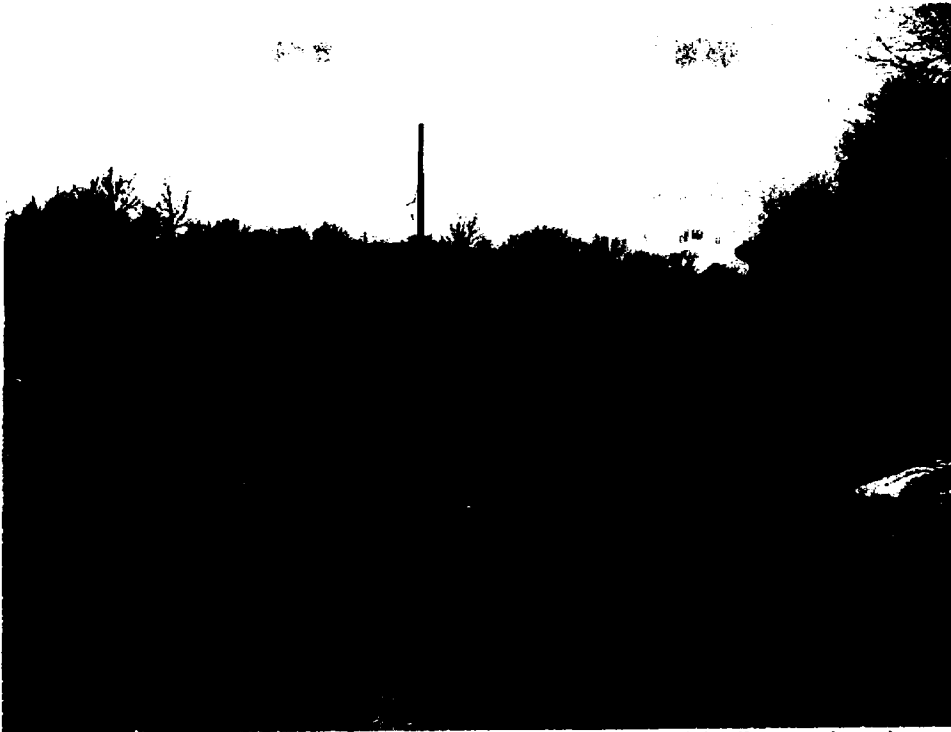
Markland Quarry - large abandoned tank in former rail unloading area.  
Drums and decontamination pool left from EPA removal action.



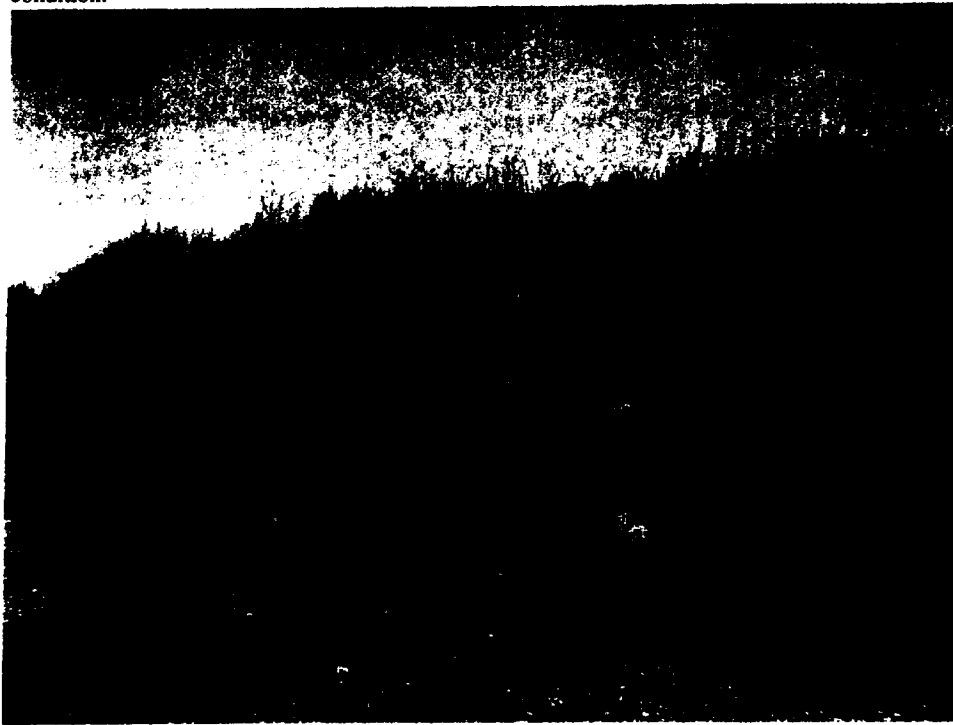


Drums stored in Markland Quarry area from EPA removal action.  
Large cut in Markland Quarry fence.





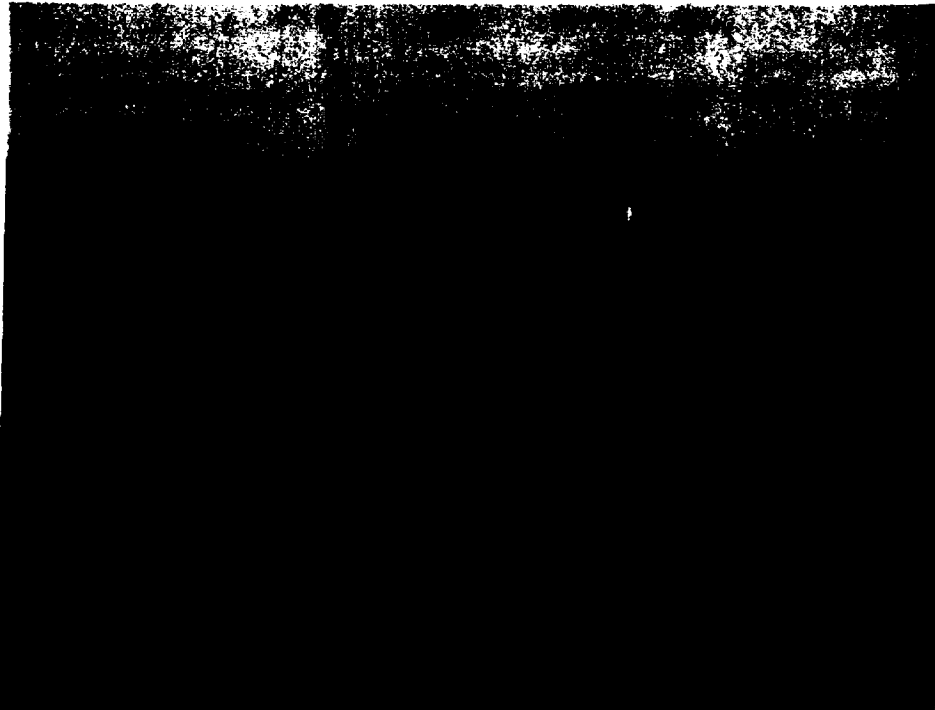
Slag Processing area - stockpiled lead-contaminated soil from residential soil removal was in poor condition.



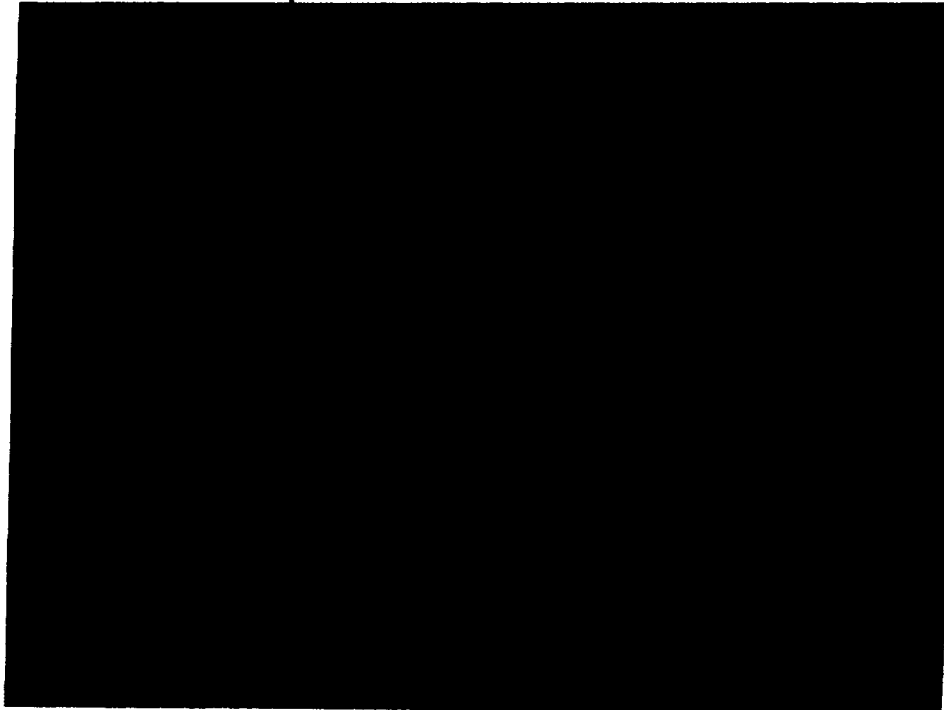


Erosion rills on slope adjacent to Wildcat Creek.  
Proximity of soil pile to Wildcat Creek.





Slag Processing area, re-graded and hydro-seeded lead-contaminated (residential) soil pile.  
Erosion on creek side of slope has been corrected.







Slag Processing area, lead-contaminated soil pile and large mounds of slag.



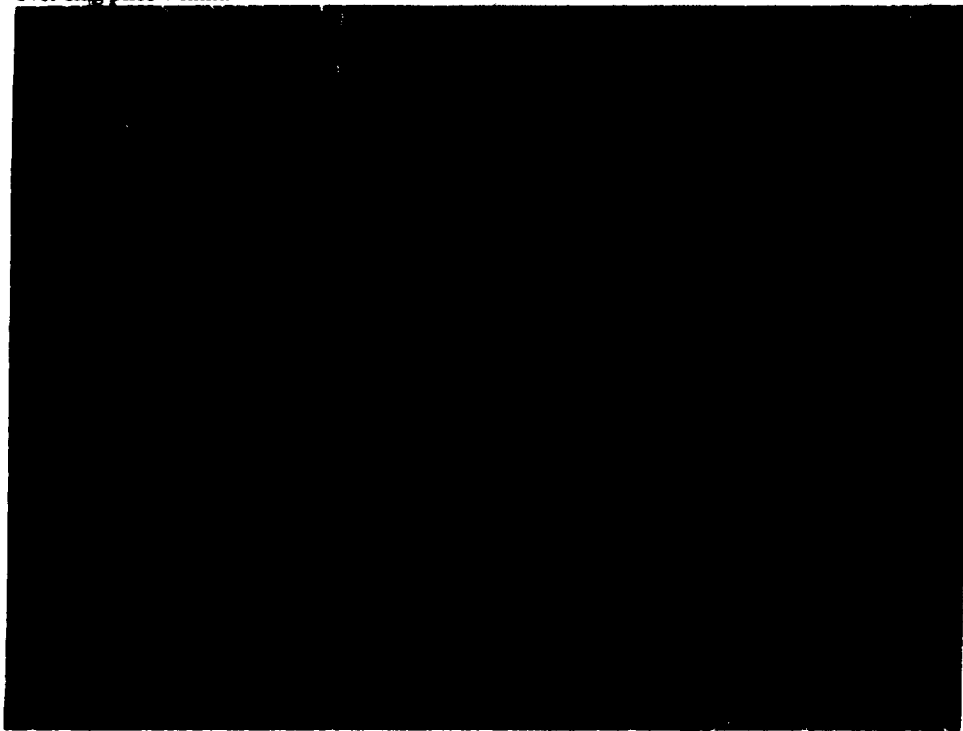


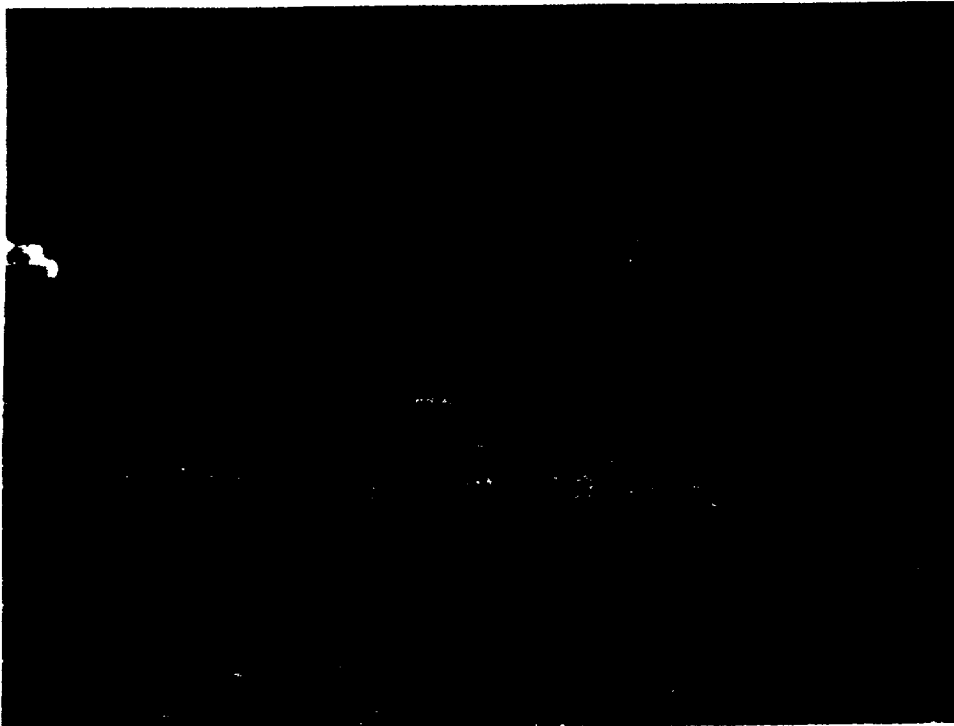
Crushed drum area.



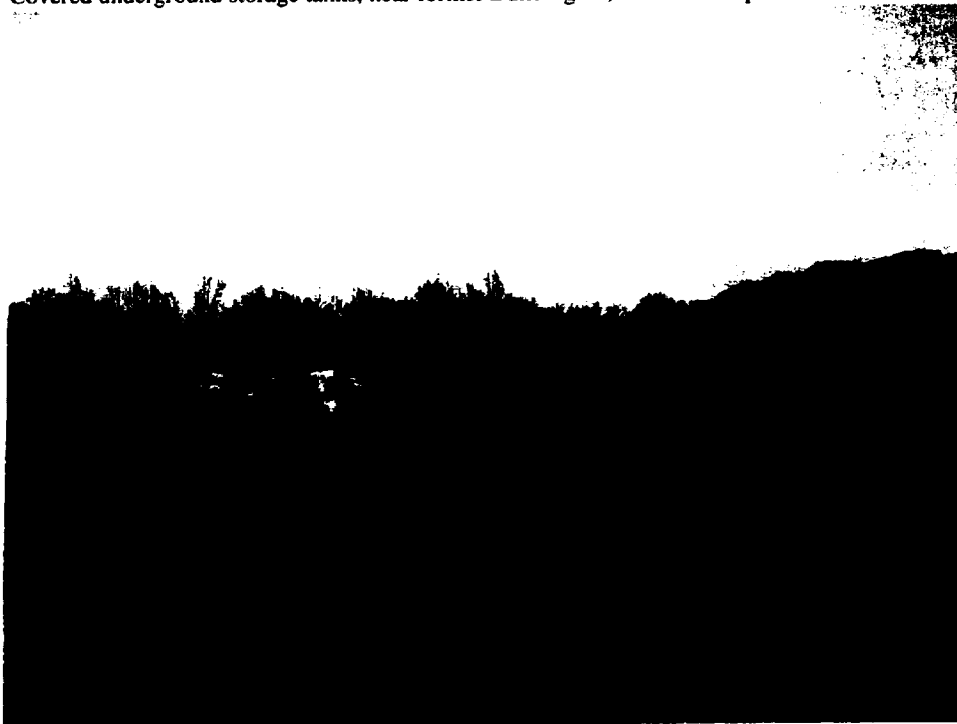


Crushed drum area, new fence cut, probably done by older children who like to ride bicycles over slag piles within.



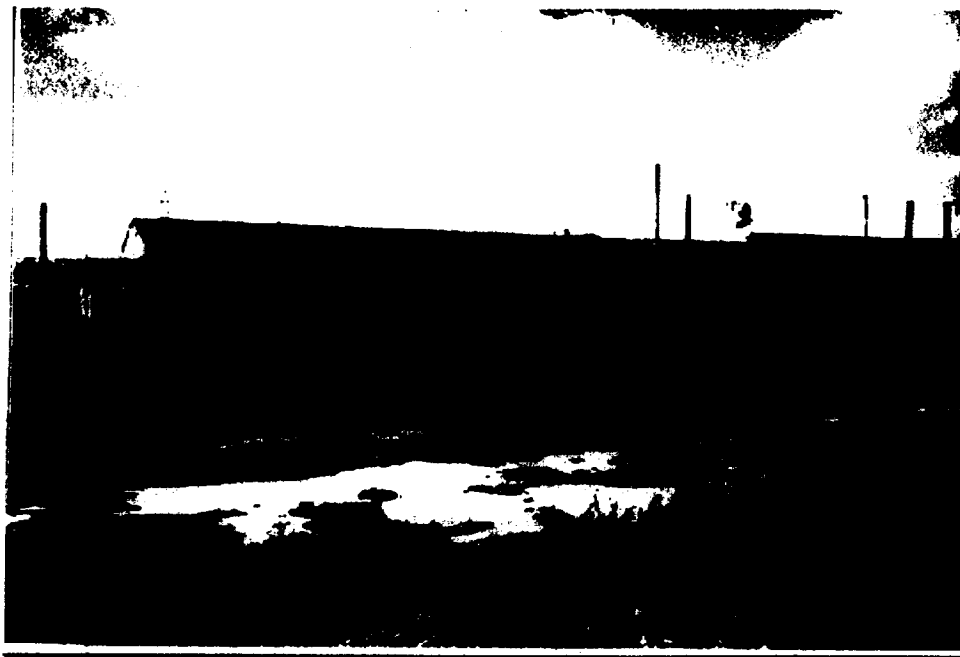


Main Plant, covered underground storage tank area, near former Building 23.  
Covered underground storage tanks, near former Building 29, clean rubble piles.





Main Plant, view looking west from Gate 1, before (below) and after (above) demolition.





Main Plant - view looking south from Markland Avenue. Wall marks location of contained asbestos.



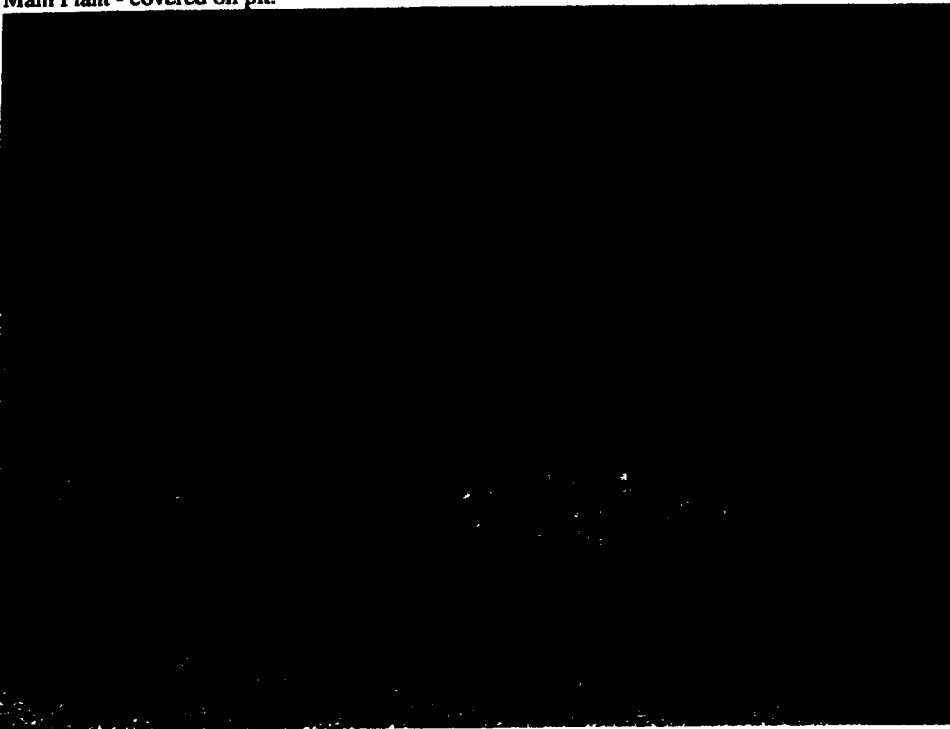


Main Plant, view looking north from Gate 1, before (below) and after (above) demolition.





Main Plant - graffiti on east wall inside site indicates recent trespassing.



Main Plant - covered oil pit.





Acid Lagoon area - graffiti on clarifier tank indicates trespassing.  
Detail shows proximity of activity to exposed asbestos insulation.





Acid Lagoon area - Graffiti inside clarifier.  
Exposed asbestos on outside wall of clarifier.



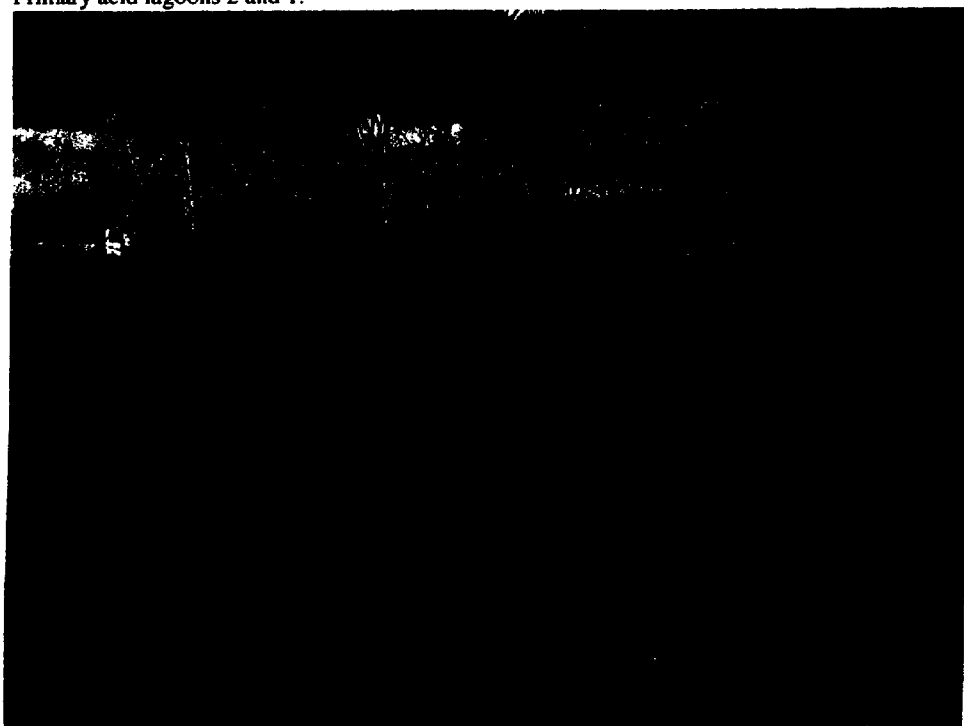


Acid Lagoon area - Graffiti on walls of dilapidated former wastewater treatment plant.



Primary acid lagoon 2.

Primary acid lagoons 2 and 1.





Northeast polishing lagoon 6  
Northwest polishing lagoon 3.





Southeast polishing lagoon 4.  
Southwest polishing lagoon 7.





Final polishing lagoon 5.

Final polishing lagoon 5, NPDES discharge point.





Northeast sludge drying bed 10.  
North central sludge drying bed 9.



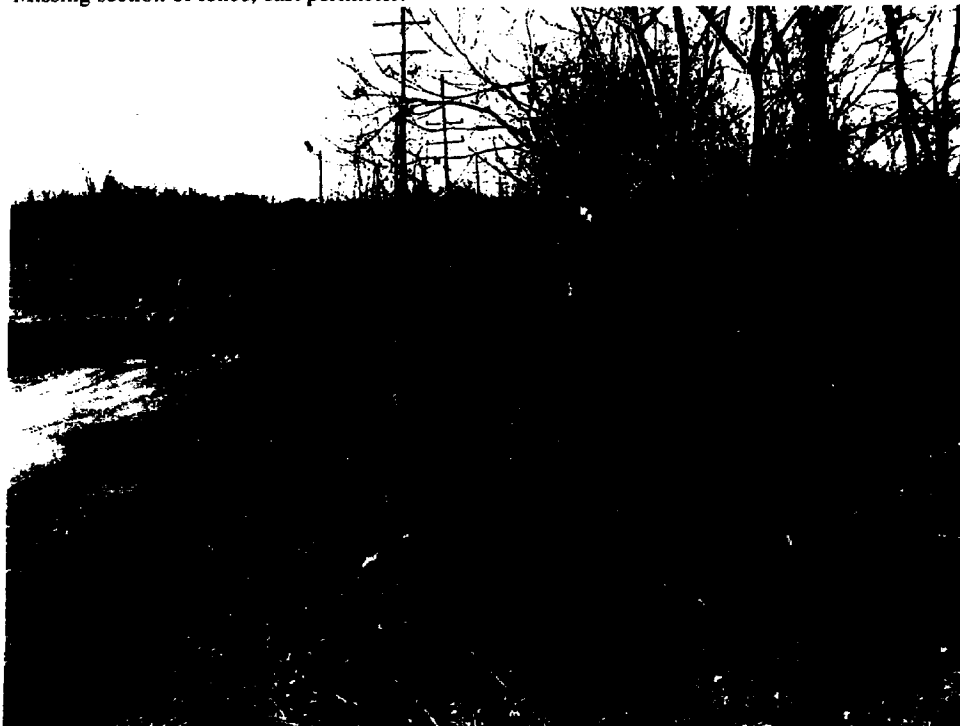




Northwest sludge drying bed 8.



Gaps in fenceline, east perimeter.  
Missing section of fence, east perimeter.





Fence damage at northeast fenceline. Trespasser access appears to come from this area.  
Fence damage at southeast fenceline, Kokomo compost operation covers fence.



## APPENDIX A - 1998 RECORD OF DECISION ARARS

This section presents a summary of those federal regulations which may be found to be applicable or relevant and appropriate to the CSSS, specifically:

- CERCLA, including the Superfund Amendments and Reauthorization Act (SARA) of 1986 and subsequent amendments;
- RCRA, including the Hazardous and Solid Waste Act Amendments of 1984 (HSWA);
- The Toxic Substances Control Act (TSCA);
- The Clean Water Act (CWA) and Amendments;
- The Safe Drinking Water Act (SDWA);
- The Clean Air Act (CAA);
- The Protection of Wetlands/Flood Plains Management Executive Order; and
- The Hazardous Materials Transportation Act.

### The Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, last amended in October 1992, provides the U.S. EPA Administrator the authority to respond to any past disposal of hazardous substances and any new uncontrolled releases of hazardous substances. Within CERCLA, a trust fund has been established for clean-up of abandoned past disposal sites and leaking underground storage facilities, as well as the authority to bring civil actions against violators of this act. The National Contingency Plan (NCP), which guides clean-up actions at Superfund sites, was developed subject to this act.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 extensively amends CERCLA. The major goals of SARA were to include more public participation, and to establish more consideration of State clean-up standards, with an emphasis on achieving remedies that permanently and significantly reduce the mobility, toxicity, or volume of wastes.

### The Resource Conservation and Recovery Act

RCRA regulates the management and land disposal of hazardous waste and solid waste material and the recovery of materials and energy resources from the waste stream. RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous wastes, as well as solid waste disposal facilities. RCRA applies to remedial actions selected that include disposal, treatment, storage, or transportation of regulated wastes. Remedies that include on site disposal of hazardous wastes will be required to meet RCRA design, monitoring, performance and closure standards. Off-site transportation of regulated wastes, whether as part of a remedial action or as generated during the investigation, will require use of the manifest system, a RCRA-licensed transporter, and proof of acceptance at a licensed facility approved for the particular wastes.

The Hazardous and Solid Waste Act Amendments (HSWA) of 1984 impose new and more stringent requirements on hazardous waste generators, transporters, and owner/operators of treatment, storage, and

disposal facilities. Land disposal restrictions, as described in 40 CFR 268, identify hazardous wastes that are restricted from land disposal and define those limited circumstances under which an otherwise prohibited waste may continue to be land disposed.

For the CSSS, the lagoons are RCRA surface impoundments. Therefore, closure of the lagoons should consider these design requirements.

#### The Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) regulates the remediation of soils contaminated with polychlorinated biphenyls (PCBs) under 40 CFR 761.125(c)(4). TSCA requires that material contaminated with PCBs at concentrations of 500 mg/kg or greater be incinerated or treated by an alternate method that achieves a level of performance equivalent to incineration. Alternate treatments other than incineration must achieve a waste soil residual concentration of less than two mg/kg. Liquids at concentrations above 50 mg/l but less than 500 mg/l and soils contaminated above 50 mg/kg may also be disposed of in a permitted chemical waste landfill. In addition, TSCA storage requirements for PCB materials with PCB concentrations of 50 mg/kg or greater prior to disposal would be applicable. Soils contaminated with PCBs in human exposure areas are to be treated or removed such that the PCB concentration in the upper 10 inches of soil is less than one mg/kg, and the concentration below 10 inches is less than 10 mg/kg.

U.S. EPA issued a proposed rule on December 6, 1994 regarding the disposal of PCBs. This proposed rule provides for disposal of non-liquid PCB remediation waste generated by the clean-up process at their existing concentration (i.e., at a concentration less than the maximum concentration of PCBs found at the remediation waste site). The proposed regulations also provide for a risk-based remediation option which bases disposal requirements for PCB remediation waste on the potential risks to health and the environment resulting from residual PCBs in the PCB-remediation waste.

#### The Clean Water Act

The Federal Water Pollution Control Act, amended by the Clean Water Act of 1977, was last amended October 1992, and is commonly referred to as the Clean Water Act (CWA). Federal Ambient Water Quality Criteria documents have been published for 65 priority pollutants listed as toxic under the CWA. These criteria are guidelines that may be used by states to set surface water quality standards. Although these criteria were intended to represent a reasonable estimate of pollutant concentrations consistent with the maintenance of designated water uses, states may appropriately modify these values to reflect local conditions. Under SARA, however, remedial actions must attain a level or standard of control that will result in surface water conditions equivalent to these criteria unless a waiver has been granted.

The water quality criteria are generally represented in categories that are aligned with different surface water use designations. These criteria represent concentrations that, if not exceeded in surface water, should protect most aquatic life against acute or chronic toxicity. For many chemical compounds, specific criteria have not been established because of insufficient data. The criteria are used to calculate appropriate limitations for discharges to surface water. These limitations are incorporated in the National Pollutant Discharge Elimination System (NPDES) permits.

The provisions of the CWA are potentially applicable to uncontrolled landfill leachate and groundwater discharges to surface water bodies and to remedial actions that include a discharge of treated water to surface water.

#### The Safe Drinking Water Act

The Safe Drinking Water Act of 1974 (SDWA), regulates the quality of water collected, distributed, or sold for drinking purposes. Standards are set for maximum contaminant levels (MCLs) permissible in water delivered to any user of public drinking water. The SDWA also has been broadened to protect groundwater and public drinking water supplies against contamination.

National primary drinking water standards established under the SDWA are promulgated as MCLs that represent the maximum allowable levels of specific contaminants in public water systems. MCLs are generally based on lifetime exposure to the contaminant for a 70 kg (154 pound) adult who consumes two liters (0.53 gallons) of water per day.

The SDWA provides for primary drinking water regulations to be established for maximum contaminant level goals (MCLGs), with MCLs as close to MCLGs as feasible. MCLGs are non-enforceable health goals at which no known or anticipated adverse effects on the health of persons would be expected to occur, thus allowing an adequate margin of safety. MCLGs only serve as goals for U.S. EPA in the course of setting MCLs and, therefore, are initial steps in the MCL rule-making process.

MCLs and MCLGs for contaminants of concern at the CSSS were established in the final Risk Assessment (CDM, 1996).

#### The Clean Air Act

The Clean Air Act (CAA), with amendments through December 1991, was enacted to protect and enhance the quality of air resources to protect the public health and welfare. The CAA is intended to initiate and accelerate national research and development programs to achieve the prevention and control of air pollution. Under the CAA, the Federal Agencies are to provide technical and financial assistance to state and local governments for the development and execution of their air pollution programs. The U.S. EPA is the administrator of the Act and is given the responsibility to meet the objectives of the Act. The Act establishes emission levels for certain hazardous air pollutants that result from treatment processes.

Requirements of the CAA are potentially applicable to remedial actions that result in air emissions, such as excavation and treatment activities.

#### The Protection of Wetlands/Flood Plain Management Executive Order

Executive Order 11990 requires Federal agencies in carrying out their responsibilities, to take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The order emphasizes the importance of the initiation of new construction located in wetlands unless there is no practicable alternative to that construction. The order also emphasizes minimizing the harm to the wetlands if the only practicable alternative requires construction in the wetland. The order requires that federal agencies provide early and adequate opportunities for public review of plans and proposals involving new construction in wetlands.

Executive Order 11988 requires federal agencies carrying out their responsibilities to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains. This order emphasizes the importance of evaluating alternatives to avoid adverse effects and incompatible development in flood plains, minimizing the potential harm to flood plains if the only practicable alternative requires siting an action in a flood plain, and providing early and adequate opportunities for public review of plans and proposals involving action in flood plains such as the Acid Lagoon area.

Appendix A of 40 CFR Part 6 describes the requirements for flood plain/wetlands review of proposed U.S. EPA actions. These regulations are potentially applicable for work to be done in the creeks or other wetland areas, and for remedial activities within the flood plain, such as the Acid Lagoon area.

#### The Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act (HMTA) of 1981, as amended, was enacted to regulate the shipping, marking, labeling, and placarding of hazardous materials that are transported on public roadways. Pursuant to the HMTA, the Department of Transportation (DOT) has promulgated regulations pertaining to transportation of hazardous materials. DOT also has jurisdiction over the packaging of hazardous materials prior to shipment.

Hazardous soils, residues, wastewaters, or wastes that are transported off-site from the CSSS will be handled according to HMTA and DOT regulations.

#### **Identification of Potential State ARARs for the CSSS**

The purpose of this section is to identify ARARs that exist based on Indiana state regulations that must be complied with when performing a remedial action. The agency charged with developing and enforcing environmental regulations for Indiana is the IDEM.

#### Indiana Water Quality Standards (IAC Title 327)

These regulations pertain to all waters in the state and are intended to restore and maintain the chemical, physical, and biological integrity of the waters of the state. The regulations include:

- Specific water quality standards and minimum treatment requirements that apply to all waters of the state. These include minimum surface water quality standards and interim groundwater quality standards;
- Regulations applying to industrial wastewater programs (NPDES);
- Regulations applying to municipal wastewater treatment facilities;
- Regulations applying to industrial wastewater discharges into sewage treatment plants; and

**I. Water quality standards for water distributed through public water supply systems.**

The procedures for developing water quality criteria based on toxicity are included in IAC Title 327, as are procedures for evaluating the characteristics of receiving waters. These procedures are used to determine discharge concentrations which if not exceeded will maintain the quality of the receiving waters.

**Indiana Solid Waste Management Board Rules (IAC Title 329)**

These regulations specify requirements that apply to solid waste and hazardous waste facilities. These include Solid Waste Management Requirements, Hazardous Waste Management Permit Program and Related Hazardous Waste Management Requirements, PCB Waste Management Requirements. The solid waste regulations include design and disposal regulations as well as monitoring requirements and standards for groundwater protection applicable to solid waste land disposal facilities. The hazardous waste regulations were developed pursuant to the requirements of RCRA and pertain to generators and transporters of hazardous waste and owners or operators of hazardous waste facilities. The PCB waste management requirements were developed based on the requirements of TSCA and pertain to the handling and disposal of PCB containing wastes which exceed 50 ppm, and in certain cases, regulate PCBs at concentrations between 2 ppm and 50 ppm.

**Indiana Air Pollution Control Regulations (IAC Title 326)**

The Indiana air pollution control regulations were developed pursuant to the Federal CAA. The regulations contain specific emission levels and requirements for monitoring emissions. They contain requirements for specific types of operations (such as burning) and for types of industry. There are also specific emissions standards for hazardous air pollutants.

**Chemical-Specific Requirements**

**Federal**

(1)Clean Air Act (42 USC 7401 et seq.), National Primary and Secondary Ambient Air Quality Standards (40 CFR 50) [U.S. EPA regulations on National Primary and Secondary Ambient Air Quality Standards].

(2)Clean Air Act (42 USC 7401 et seq.), National Emission Standards for Hazardous AirPollutants (40 CFR 61), Subpart M, National Emission Standards for Asbestos. [Standards for demolition and renovation, asbestos waste disposal].

(3)Clean Water Act (33 USC 1251, et seq.), Water Quality Standards (40 CFR 131) [U.S. EPA regulations on establishing water quality standards].

(4)Safe Drinking Water Act (42 USC 300f, et seq.), Maximum Contaminant Levels (40 CFR 141.11 - 141.16) [Sets standards for contaminants in public drinking water supplies].

(5)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Land Disposal Restrictions (40 CFR 268) Subpart D, Treatment Standards [Sets the treatment standards for waste extract, specified technology, hazardous waste debris].



(6)Solid Waste Disposal Act, (15 USC 6901, et seq.), Identification and Listing ofHazardous Waste (40 CFR 261) Subpart B, Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Waste [Sets criteria for identifying ahazardous waste].

(7)Solid Waste Disposal Act, (15 USC 6901, et seq.), Identification and Listing ofHazardous Waste (40 CFR 261) Subpart C, Characteristics of Hazardous Waste [Identifies the characteristics of a hazardous waste].

(8)Solid Waste Disposal Act, (15 USC 6901, et seq.), Identification and Listing ofHazardous Waste (40 CFR 261) Subpart D, List of Hazardous Waste [List of hazardouswaste from sources].

(9)Toxic Substances Control Act, as amended (15 USC 2607-2629; PL 94-469 et seq.), Polychlorinated Biphenyl (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761), Subpart G, PCB Spill Clean-up Policy [Sets clean-up standards for PCB-contaminated materials].

#### **State**

(10)Air Pollution Control Board (Title 326), Article 6 - Particulate Rules, Fugitive Dust Emissions (326 IAC 6-4) [Sets emission limitations for particulate].

(11)Air Pollution Control Board (Title 326), Article 1 - General Provisions (326 IAC 1-1) [Lists general provisions for major new sources, including ambient air quality standards. New sources which have the potential to emit 25 tons per year of a hazardous air pollutant must apply for a part 70 permit].

(12)Air Pollution Control Board (Title 326) Article 8 - Volatile Organic Compound Rules (326 IAC 8 - 6) [Sets criteria that sources which emit 3 lbs/hour or 15 lbs/day of volatile organic compounds need to register with the Office of Air Management].

(13)Air Pollution Control Board (Title 326), Article 14 - Emission Standard for Hazardous Air Pollutants, Emission Standards for Sources of Asbestos Listed in Section 1 of this Rule (326 IAC 14-2) [Presents a list of asbestos sources subject to federal standards].

(14)Solid Waste Management Board (Title 329), Article 10 - Solid Waste Management, Solid Waste Land Disposal Facility Classification (329 IAC 10-9) [Describes construction/demolition sites waste criteria and restricted waste sites waste criteria].

(15)Solid Waste Management Board (Title 329), Article 10 - Solid Waste Management, Special Waste (329 IAC 10-8) [Defines what qualifies as a special waste, including asbestos containing waste, and waste characterized as hazardous waste; describes the technical criteria for characterizing special waste and generator responsibility for special waste disposal].

(16)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Identification and Listing of Hazardous Waste (329 IAC 3.1-6) [Sets list and exemptions of hazardous waste].

(17)Solid Waste Management Board (Title 329), Article 4 - PCB Waste Management (329 IAC 4-1) [Sets requirements for the disposal of PCBs at concentrations which exceed 50 ppm and separate requirements for those containing between 2 ppm and 50 ppm].

(18)Water Pollution Control Board (Title 327), Article 2 - Water Quality Standards (327 IAC 2-1-6, 2-1-7 and 2-1-1.5) [Sets requirements for Water Quality Effluent and includes minimum Surface Water Quality Standards and Interim Groundwater Quality Standards].

(19)Water Pollution Control Board (Title 327), Article 8 - Public Water Supply (327 IAC 8-2) [Sets standards for drinking water].

## **Location-Specific Requirements**

### **Federal**

(20)Clean Water Act, (33 USC 1251, et seq.), Permits for Dredge or Fill Material (Section 404) [Requires that no activity that adversely affects a wetlands shall be permitted if a practicable alternative that has less effect is available].

(21)Fish and Wildlife Coordination Act (16 USC 661, et seq.) [Requires that any federal agency that proposes to modify a body of water must consult U.S. Fish and Wildlife Services].

(22)National Environmental Policy Act (42 USC 4321) Executive Order 11990, Protection of Wetlands [Requires federal agencies to minimize the destruction, loss, or degradation of Wetlands and preserve].

(23)National Environmental Policy Act (42 USC 4321) Executive Order 11988, Floodplain Management [Requires federal agencies to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of flood plains].

(24)National Environmental Policy Act (42 USC 4321) Statement of Procedures on Floodplain Management and Wetland Protection (40 CFR 6) Appendix A to Part 6 [Promulgates Executive Orders 11988 and 11990 regarding wetlands and flood plains].

(25)Solid Waste Disposal Act (42 USC 6901, et seq.), Solid Waste Subpart B, Location Standards (40 CFR 264.18) [Sets requirements for constructing a RCRA facility on a 100-year flood plain].

(26)Flood Control Act (IC 14-28-1), [Requires formal approval for any construction, excavation or filling in the floodway outside of the Superfund boundary].

(27)Water Resources Management Act (IC-14-25-7) [Requires registration of any significant water withdrawal facility with the Department of Natural Resources. A significant water withdrawal facility is defined as any water withdrawal facility that, in the aggregate from all sources and by all methods, has the capacity to withdraw more than 100,000 gallons of groundwater or surface water or a combination of the two in one day. This would also include any potable pumps employed by the facility].

### **State**

(28)Air Pollution Control Board (Title 326), Article 2 - Permit Review, Construction Permits (326 IAC 2-1) [Sets requirements for obtaining a permit prior to construction or modification].

(29)Solid Waste Management Board (Title 329) Article 2 - Solid Waste Management, Siting and Design Standards for Solid Waste Land Disposal Facilities (329 IAC 2-10) [Prohibits solid waste boundary of new solid waste land disposal facility from wetlands in violation of Section 404 of

the Clean Water Act, as amended and within the floodplain unless the waste is protected from flood water inundation by a dike; establishes design standards for construction/demolition sites and restricted waste sites].

## **Action-specific Requirements**

### **Federal**

(30)Clean Air Act, (42 USC 740 et seq.), National Primary and Secondary Ambient Air Quality Standards (40 CFR 50) [Specifies maximum primary and secondary 24-hour concentrations for particulate matter].

(31)Clean Water Act, (33 USC 1251, et seq.), Permits for Dredge or Fill Material (Section 404) [Provides requirements for discharges of dredged or fill material. Under this requirement, no activity that affects a wetland shall be permitted if a practicable alternative that has less impact on the wetland is available. If there is no other practicable alternative impacts must be mitigated. A Section 401 water quality certification may be required from IDEM if wetlands or other waters of the state are impacted].

(32)Department of Transportation Rules for Transportation of Hazardous Materials, (49 CFR Parts 107, 171.1 - 171.5) [Outlines procedures for the packaging, labeling, and transporting of hazardous materials].

(33)Noise Control Act, as amended (42 USC 4901, et seq.); Noise Pollution and Abatement Act (40 USC 7641, et seq.), Noise Emission Standards for Construction Equipment (40 CFR 204) [The public must be protected from noise that jeopardize health and welfare].

(34)Protection of Archeological Resources (32 CFR Part 229, 229.4; 43 CFR Parts 107, 171.1 - 171.5) [Develops procedures for the protection of archeological resources].

(35)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Guideline for the Land Disposal of Solid Wastes (40 CFR 241), Part B - Requirements and Recommended Procedures [Solid, nonhazardous wastes generated as a result of remediation must be managed in accordance with federal and state regulations; this is applicable to waste generated by the remedial action].

(36)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Standards for Hazardous Waste Generators (40 CFR 262) and Standards for Hazardous Waste Transporters (40 CFR 263); [General requirements for packaging, labeling, marking, and manifesting hazardous wastes for temporary storage and transportation offsite]. Any residues determined to be RCRA hazardous waste destined for offsite disposal are subject to manifest requirements. Remedial actions involving offsite disposal of RCRA listed wastes will be subject to this requirement.

(36)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Interim Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities (40 CFR 265), Storage, and Disposal General Facility Standards, Subpart G, Closure and Post-closure. [Sets general requirements for closure of interim status hazardous waste management units].

(38)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities (40 CFR 265) Subpart K, Surface Impoundments. [Establishes requirements for closure and post-closure care of interim status surface impoundments].

(39)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Land Disposal Restriction-RCRA (40 CFR 268) [RCRA Land Disposal Restriction, defines hazardous waste debris. This requirement is applicable to those RCRA hazardous wastes that will be disposed offsite. Land Disposal Restrictions will not apply to on-property disposal under the Corrective Action Management Unit (CAMU) Rule].

(40)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (40 CFR 280), Subpart G, Out-of-Service UST Systems and Closure, [Sets requirements for temporary and permanent UST closure, and assessing the site closure].

(41)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264), Subpart B, General Facility Standards; Subpart C, Preparedness and Prevention; Subpart D, Contingency Plan and Emergency Procedures; Subpart E, Manifest System, Record Keeping and Reporting [Establishes general requirements for storage and treatment facility location, design and inspection, waste compatibility determination, emergency contingency plans, preparedness plans, and worker training].

(42)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.),Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264) Subpart F, Releases from Solid Waste Management Units [Details requirements for a groundwater monitoring program to be installed at the site].

(43)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.),Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264) Subpart G, Closure and Post-Closure [Defines specific requirements for closure and post-closure of hazardous waste facilities].

(44)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264), Subpart I, Use and Management of Containers; Subpart J, Tank Systems; Subpart K, Surface Impoundments; Subpart L, Waste Piles; and Subpart N, Landfills. [Containers, surface impoundments, and landfills used to store hazardous waste must be closed and in good condition. Tank systems must be adequately designed and have sufficient structural strength and compatibility with the wastes to be stored or treated to ensure that it will not collapse, rupture, or fail, including secondary containment. Waste piles must be designed to prevent migration of wastes out of the pile into adjacent subsurface soil or groundwater or surface water at any time during its active life. Disposal of special wastes in landfills must be done in accordance with requirements].

(45)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264), Subpart DD, Containment Building. [Hazardous waste and debris may be placed in units known as containment buildings for the purpose of interim storage or treatment].

(46)Toxic Substance Control Act, as amended (15 USC 2607-2629; PL 94-469, et seq.), Polychlorinated Biphenyl (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761). Subpart D, Storage and Disposal [Provides requirements for storage and disposal of materials containing PCBs].

The following is a list of potential ARARs for Corrective Action Management Units (CAMUs) at Superfund sites:

(47)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Hazardous Waste Management System: General (40 CFR 260) Subpart B, Definitions [A CAMU shall only be used for the management of remediation wastes pursuant to implementing such corrective action requirements at the facility].

(48)Solid Waste Disposal Act, as amended (42 USC 6901, et seq.), Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264), Subpart S, Corrective Action Management Unit [Allows remediation waste treatment, storage, and disposal within a corrective action management unit, which can encompass one or more units or areas where contaminants are found].

The following is a list of potential ARARs for Superfund sites that discharge treated groundwater to Publicly Owned Treatment Works (POTW):

(49)Clean Water Act, (33 USC 1251, et seq.), National Pollutant Discharge Elimination System (NPDES) Permit Regulations [40 CFR part 122.42(b)] [Requires notification of issuing authority of re-evaluation of POTW pretreatment standards (it must be noted that in the event that the POTW does not have a local limitation for a particular pollutant found in the leachate from a Superfund site, it must re-evaluate its local limitations, and develop a limitation if necessary to protect the POTW from interference, pass-through, or contamination of the sewage sludge)].

(50)Clean Water Act, (33 USC 1251, et seq.), National Pretreatment Standards (40 CFR Part 403.5) [Discharge to a POTW must not interfere, pass through untreated into the receiving waters, or contaminate sludge].

(51)Clean Water Act, (33 USC 1251, et seq.), National Pretreatment Program Requirements for POTWs [40 CFR Part 403.8(f)].

The following is a list of potential ARARs for Superfund sites that discharge treated groundwater to surface water bodies:

(52)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations (40 CFR Part 122.21) [Permit application must include a detailed description of the proposed action including a listing of all required environmental permits].

(53)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations (40 CFR Part 122.44) (Established limitations, standards, and other NPDES permit conditions including federally approved State water quality standards].

(54)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations [40 CFR Part 122.44(a)] [Best Available Technology (BAT) for toxic and non-conventional wastewater or Best Conventional Technology (BCT) for conventional pollutants].

(55)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations [40 CFR Part 122.44(b)] [Effluent Limitations and Standards requirements under Section 301, 302, 303, 307, 318, and 405 of the Clean Water Act (CWA)].

(56)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations, Water Quality Standards and State Requirements [40 CFR Part 122.44(d)] [Water Quality Based Effluent Limitations (WQBELs), any requirements in addition to or more stringent that promulgated effluent limitations and guidelines or standards under Section 301, 304, 306, 307, 318, and 405 of the CWA].

(57)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations, Technology Based Controls for Toxic Pollutants [40 CFR Part 122.44(e)] [Discharge limits established under paragraphs (a), (b), or (d) of 40 CFR Part 122.44 must be established for toxics to be discharged at concentrations exceeding levels achievable by the technology-based (BAT/BCT) standards].

(58)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations [40 CFR Part 122.44(f)] [Requires monitoring of discharges to ensure compliance].

(59)Clean Water Act, (33 USC 1251, et seq.), NPDES Permit Regulations [40 CFR Part 125.100] [The site operator must include a detailed description of the proposed action including a listing of all required environmental permits].

(60)Clean Water Act, (33 USC 1251, et seq.), (40 CFR Part 131) [States are granted enforcement jurisdiction over direct discharges and may adopt reasonable standards to protect or enhance the uses and qualities of State surface water bodies].

(61)Clean Water Act, (33 USC 1251, et seq.), (40 CFR Parts 136.1 - 136.4)[Requires adherence to sample preservation procedures including container materials and sample holding times].

(62)Fish and Wildlife Coordination Act, (16 USC 661, et seq.), [Requires that any federal agency that proposes to modify a body of water must consult the U.S. Fish and Wildlife Services].

### State

(63)Air Pollution Control Board (Title 326), Article 14 - Emission Standard for Hazardous Air Pollutants, Emission Standards for Asbestos; Demolition and Renovation Operation (326 IAC 14-10) [Sets the notification requirements , procedures for asbestos emission control and demolition fees for demolition projects where asbestos may be present].

(64)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Standards Applicable to Generators of Hazardous Waste (329 IAC 3.1-7) [Lists those standards applicable to generators of hazardous waste, including manifesting].

(65)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Standards Applicable to Transporters of Hazardous Waste (329 IAC 3.1-6) [Same standards as 40 CFR 263].

(66)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Final Permit Standards for Owners and Operators of Hazardous Waste Treatment, Storage and disposal Facilities (329 IAC 3.1-9) [Same standards as 40 CFR 264].

(67)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Interim Status Standards for Owners

and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (329 IAC 3.1-10) [Same standards as 40 CFR 265].

(68)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Land Disposal Restrictions (329 IAC 3.1-12) [Sets standards for land disposal restrictions and the adoption of federal land disposal restrictions].

(69)Solid Waste Management Board (Title 329), Article 3.1 - Hazardous Waste Management Permit Program and Related Hazardous Waste Management, Financial Requirements for Owner and Operators of Interim Status Hazardous Waste Treatment, Storage, and Disposal Facilities (329-IAC 3.1-14) [Requires a cost estimate and financial assurance for closure and post-closure care of interim status facilities; outlines approach options such as a closure trust fund for establishing financial assurance for closure and post-closure care of a facility; provides wording for trust agreement].

(70)Solid Waste Management Board (Title 329) Article 4 - PCB Waste Management, Disposal of PCB Wastes (329 IAC 4-1) [Same standards as 40 CFR 761].

(71)Solid Waste Management Board (Title 329), Article 9 - Underground Storage Tanks, Corrective Action (329 IAC 9-5) [Sets standards for release response, and corrective action, including abatement measures, characterization, and free product removal].

(72)Solid Waste Management Board (Title 329), Article 9 - Underground Storage Tanks, Closure (329 IAC 9-6) [Sets standards for closing or change-in-service for USTs].

(73)Solid Waste Management Board (Title 329), Article 2 - Solid Waste Management, Industrial Onsite Activities Needing Permits (329 IAC 2-5) [Describes the applicability and application requirements for permits].

(74)Water Pollution Control Board (Title 327), Article 15 - Storm Water Run-off Associated with Construction Activity (327 IAC 15-5) [Sets requirements for managing point source discharges (stormwater) during construction activities, including sediment and erosion control].

(75)Water Pollution Control Board (Title 327) Article 3 - Wastewater Treatment Facilities, Construction and Permit Requirements (327 IAC 3-2) [Sets criteria for wastewater treatment facilities and issuance of permits and requirements for construction and permits].

(76)Water pollution Control Board (Title 327) Article 5 - Industrial Wastewater Programs (NPDES), (327 IAC 5-3) [Sets procedures for the issuance of NPDES permits].

## **Other Requirements to be Considered (TBCs)**

### **Federal**

(77)Geological Survey Professional Paper 579-0, Elemental Composition of Surficial Materials in the Conterminous United States, 1971. Schacklette, H.T., J.C. Hamilton, J.G. Boerrgen and J.M. Bowles [Provides background levels of metal in soils for the United States].

(78)National Oceanic and Atmospheric Administration Technical Memorandum NOSOMA52 1990. The Potential for Biological Effects of Sediment - sorbed Contaminants Tested in the

National States and Trends Program; Long E.R. and L.G. Morgan. [Provides sediment quality guidelines]

(79)National Oceanic and Atmospheric Administration Quick Reference Cards, 1994, Buchman, M., HAZMAT Report 94-8. [Provides sediment quality guidelines].

(80)Ontario Ministry of the Environment Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, 1993, Persaud D., Joaumas, A. Hayton. [Provides sediment quality guidelines]

(81)Occupational Safety and Health Administration Standards (29 CFR 1910; 1910.1000), Subpart Z, Toxic and Hazardous Substances [Sets worker exposure limits to toxic and hazardous substances and prescribes the methods for determination of concentrations].

(82)Occupational Safety and Health Administration Standards (29 CFR 1910; 1910.95), Subpart G, Occupational Noise Exposure. [Sets limits of worker exposure to noise during the performance of their duties].

(83)Occupational Safety and Health Administration Standards (29 CFR 1910; 1910.120), Hazardous Waste Operations and Emergency Response [Sets the standards for workers conducting hazardous waste operations and emergency response].

(84)Occupational Safety and Health Administration Standards (29 CFR Part 1926) [Specifies the type of safety equipment and procedures to be followed during site remediation].

(85)Occupational Safety and Health Administration Standards Record keeping, Reporting and Related Regulations (29 CFR 1904) [Establishes Record keeping and reporting requirements for an employer under OSHA].

(86)OSWER Directive 9355.4-01-Guidance on Remedial Actions for Superfund Sites with PCB Contamination [Sets soil PCB clean-up levels and management controls for PCB concentrations at Superfund sites].

(87)OSWER Directive 9355.4-12 - Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Sites and RCRA Corrective Action Facilities. [Sets soil lead clean-up levels for Superfund sites].

(88)Safe Drinking Water Act (42 USC 300f, et seq.), Subpart F, Maximum Containment Level Goals (40 CFR 141.50 - 141.51) [Establishes unenforceable clean-up goals for drinking water based on technology and health risk].

(89)Threshold Limit Values [Consensus standards for controlling air quality in work place environments; used to assess site inhalation risks for soil removal operations].

(90)U.S. Environmental Protection Agency, RCRA Guidance Manual for Subpart G Closure and Post-Closure Standards and Subpart H Cost Estimating Requirements, January 1987. [Provides guidance on closure and post-closure standards and cost estimating requirements for hazardous waste management units].

(91)U.S. Environmental Protection Agency, Closure of Hazardous Waste Surface Impoundments, September, 1980. [Provides guidance for closure of surface impoundments].



(92)U.S. Environmental Protection Agency, Disposal of Polychlorinated Biphenyls, Proposed Rule, December 6, 1994. [Provides for disposal of non-liquid PCB remediation waste generated by clean-up process of their existing concentration; provides for a risk-based remediation option for PCB remediation waste].

(93)U.S. Environmental Protection Agency, Soil Screening Guidance, December 1994 [Provides generic risk-based soil screening values for Superfund sites].

(94)U.S. Environmental Protection Agency Region III, Risk - Based Concentration Table, Smith R., 1995. [Provides risk-based screening values for groundwater and soil concentrations].

(95)U.S. Environmental Protection Agency, Integrated Risk Information System (IRIS), 1995 - 1996. [Provides reference doses and cancer potency slopes for calculating the hazard index or incremental cancer risk for specific site contaminants].

(96)U.S. Environmental Protection Agency, Interim Policy for Planning and Implementing CERCLA Off-Site Response Actions, November 5, 1995. [Specifies appropriate method of off-site treatment on disposed of waste from a Superfund site].

(97)U.S. Environmental Protection Agency, Sediment Quality Criteria for the Protection of Benthic Organisms: Dieldrin, Endrin, Fluoranthene and Phenanthrene, 1993. [Provides sediment quality criteria].

(98)U.S. Environmental Protection Agency, Summary Quality Criteria for Water, Office of Science and Technology, 1992. [Provides ambient water quality criteria].

(99)U.S. Environmental Protection Agency, Quality Criteria for Water, Office of Water Regulation and Standards, U.S. EPA 440/5-86-001, 1986. [Provides ambient water quality criteria].

(100)U.S. Environmental Protection Agency, Ambient Water Quality Criteria for Polychlorinated Biphenyls, U.S. EPA 440/5-80-068, 1980. [Provides ambient water quality criteria for PCBs].

(101)U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund: Environmental Evaluation Manual, Volume II, Final Report, EPA/540/1-89/002, 1989. [Provides guidance for conducting ecological risk assessments].

(102)U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund. Volume I. Human Health Evaluation Manual Supplemental Guidance. Standard Default Exposure Factors, Interim Final, March, 1991. OSWER Directive #9285.6-03, 1991. [Provides exposure factors for estimating hazard or risk in human health risk assessments].

(103)U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual, Part A, December, 1989. U.S. EPA 540/1-89/002. Office of Emergency and Remedial Response. [Provides guidance on preparing a baseline human health risk assessment using the four steps, data evaluation, exposure assessment, toxicity assessment, risk characterization].

The following is a list of TBCs for obtaining a technical impracticability (TI) waiver for groundwater at Superfund sites:

(104)OSWER Directive 9200.4-14, Consistent Implementation of the Fiscal Year 1993 Guidance on Technical Impracticability of Groundwater Restoration at Superfund sites. [Addresses implementation of the OSWER guidance for evaluating TI waivers].

(105)OSWER Memorandum July 31, 1995, Superfund Groundwater RODs: Implementations change their Fiscal Year, [Discusses appropriateness of TI waivers for groundwater contaminated with DNAPLS].

(106)OSWER Directive 9234.2-25, Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration - Interim Final. [Provides guidance for evaluating TI waivers].

The following is a list of TBCs related to corrective action management units (CAMUs) at Superfund sites. It is noted that a number of these TBCs are under consideration and not yet promulgated.

(107)U.S. Environmental Protection Agency, Environmental News, January 15, 1993 [States that CAMU is applicable for contiguous areas within a facility as designated by the Regional Administrator for the purpose of implementing corrective action requirements of this Subpart (40 CFR 260.10), which is contaminated by hazardous waste (including hazardous constituents), and which may contain discrete, engineered land-based sub-parts].

(108)U.S. Environmental Protection Agency, Requirements for Management of Hazardous Contaminated Media, Proposed Rule, April 29, 1996. [Proposes new regulations for contaminated material that are managed during government-overseen remedial actions; proposes to withdraw the regulations for CAMUs].

#### State

(109)Indiana Department of Environmental Management, Voluntary Remediation Program, 1995. [Provides risk-based voluntary clean-up concentrations].

(110)Indiana Department of National Resources, Indiana Handbook for Erosion Control in Developing Areas. [Establishes design criteria, standards and specifications for erosion control measures required within a construction site].

(111)Indiana Soil Conservation Service, Field Office Technical Guide [Establishes design criteria, standards and specifications for erosion control measures required within a construction site].

(112)New York Department of Environmental Conservation (NYSDEC), Technical Guidance for Screening Contaminated Sediments, 1993, NYSDEC Divisions of Fish and Wildlife and Marine Resources. [Provides sediment quality guidelines].



**APPENDIX B**  
**Comments Received from Support Agencies and/or the Community**